POWER

GENERAL INDEX TO VOLUME LI

January 1 to June 30, 1920

EXPLANATORY NOTE

Illustrated articles are marked with an asterisk (*), book notices with a dagger (†), inquiries with a double dagger (‡). The cross-references condense the material and assist the reader, but are not to be regarded as complete or conclusive. So, if there were a reference from "Boiler" to "Trap," and if the searcher failed to find the required article under the latter word, he should look through the "Boiler" entries, or others that the topic might suggest, as he would have done had there been no cross-reference. Letters are indexed under title or subject, general articles under writer's name as well. Not all articles relating to a given topic necessarily appear under the same entries.

Following is a list of the pages included in the several numbers of the volume, by date:

Jan.	6	Pages	1-46
"	13	"	47-84
"	20	"	85-122
"	27	"	123-160
Feb.	3	"	161-206
"	10	"	207-246
"	17	"	247-284
"	24	"	285-318
Mar.	2	"	319-364
"	9	"	365-406
"	16	"	407-448
"	23	"	449-490
"	30	"	491-530
Apr.	6	"	531-574
"	13	"	575-614
"	20	"	615-652
"	27	"	653-692
May	4	"	693-750
"	11	"	751-790
"	18	"	791-830
"	25	"	831-866
June	1	"	867-906
"	8	"	907-948
"	15	"	949-988
"	22	"	989-1028
"	29	"	1029-1062

A

Page

Abatement laws—Swat the waster *41
Abbott, W. L.—A leader in power-plant operation *667
Aboard ship, Mechanical stokers. Bromley *86
Absorption. See "Refrigeration."
Accident, Carefulness guards against *945
Accidental deaths, Number of—"Better safe than sorry" 306
Accidents on low-voltage circuits, Fatal 341, 856
"Africa" largest Diesel-engine driven ship in the world 970
Air-compressing and refrigerating machinery, Exports, during Oct. 1919, of 197
Air compression, Advantages of two-stage ..... ‡821
Air compressor, A perfected high-pressure rotary ammonia and, Lord *156
Air compressor—Automatic control for motors driving pumps and compressors, Jones *498
Air compressor—Emergency automatic controller, Briggs *143
Air-compressor lubrication, Osborne 495
Air compressor—On the road with the refrigeration troubleman, Moran 807
Air compressors, Advantages of turbo ..... ‡739
Air compressors—Year's progress in the power field *2, 31
Air from factories, Losses due to removing hot, Alden *93
Airplane—New machine developed by P. C. Hewitt 277
Airplane, Sampling atmosphere by *279
Airplanes for mine rescue work 1012
Air, Testing engines for 40,000 ft. in the, McBride *792
Air through small brass tubes, Flow of, Taylor *1022
Alarm clock used to open oil switch automatically *601
Alarm whistle, Accumulator travel *434
Alaska lignite and spruce wood, Steaming value of 638
"Alcogas"—Gasoline substitute makes good showing 94
Alcohol as fuel, Possibilities of 177
Alibi Al, Strohm *407
Aligning the engine, Overhauling and, Airey *764
Alignment diagram, A steam *1045
Alignment, Springing a 15-ton crankshaft into *76
Allan-Diffenbaugh Wrench and Tool Co.—Adjustable ratchet wrench *776
Allen, J. R.—A veteran engineering research worker *636
Alternating current came into use, How 25-cycle 303
Alternator, How power factor affects the voltage regulation of an, Graham *379
Alternator to lose field control, Grounds cause *855
Alternators having opposite polarity in parallel, Operating two similar, Briggs *810, 816
Alternators, Turbine-driven vs. engine-driven—I, Mortensen ... *330, II, *425, III, *469

Page

Alternators, Vertical-shaft waterwheel-driven—Mechanical features, Mortensen *698, Lubricating system and rotor *837, Brakes, ventilation and exciters ... *953
Alternators when they rotate in opposite directions, Paralleling two, Briggs *886
American Association of Engrs.—Shortage of engineering specialists 115, Outlook for engineering service 118, New engineering publicity 155, Claims membership of 18,000 157, Organizes Ohio State Assembly 197, Trade unionism in the engineering profession 358, Furtherance of license legislation 358, National unity plan 358, Convention 743, Activities .. 827
American Boiler Mfrs.' Asso.—Season fluctuations in boiler industry *259, Paper *684 (Criticism) 932, Convention *982, Ed. 971
American coal-mining conditions, Comparison of British and 687
American Inst. Elec. Engrs.—Midwinter convention 200, 398, Meet in Pittsburgh 399, Paper *440, Ed. 431, Boston meeting 443, Presidential address 523, Paper 708, Committee on Super-Power System 758, Orville Wright presented with John Fritz Medal 823, Discussion on regional power development, etc. 824, Ed. 815, Elects officers 900, Edison Medal presented to Wm. Le Roy Emmet *901, Annual convention 940
American Institute Mining and Metallurgical Engrs.—Stabilization of the bituminous coal industry 387, Paper *422, Ed. 431, Paper *492, Ed 515, Paper 522
American Library Ass'n. 558
American Order Steam Engrs.—Sentiments of safe and sound unionism 72, Convention 1024
American Soc. Heating and Ventilating Engrs.—Papers 352, *550, 610, J. R. Allen—A veteran engineering research worker *636, Paper 687, St. Louis meeting 944, Ed. 930
American Soc. Refrigerating Engrs.—St. Louis meeting 943, Ed. 930
Ammonia charge goes, Where the, Porter 618, 896
Ammonia coil for cooling water ..... ‡37
Ammonia-compression system—Refrigeration study course, Macintire *138 The ammonia compressor *220
Ammonia fittings and accessories—Refrig. study course, Macintire *459
Ammonia from coils, Precaution when pumping, Hill *718
Ammonia in circulation in compression refrigeration, Two indirect methods of finding the weight of, Gavett *1042
Ammonia leaks in refrigerating plants, Testing for, Hill *955
Ampere-turns in field coils 976
Arc welding machine, Automatic *548
Arctic regions, Electric power in the *666
Armature, Faulty soldering caused trouble on d.-c. *107
Armature without removing it from frame, Banding an *1056
Armour Institute of Technology—Prof. G. F. Gebhardt *1008
Armour South St. Paul plant, New *48
Arrester, Oxide-film lightning *956
Artificial daylight achieved 118
Artificial fuel, A new? 816
Ash from Eastern coals, The fusibility of. *437
Ash, Loss due to combustible in, Gauss ... *182
Association Iron and Steel Elec. Engrs.—Papers 80, 115, 445, 734, *861
Association of Railway Elec. Engrs.—Committee report 192
Atmosphere by airplane, Sampling *279
Autogenous welding, Rules for 471
Autogenous welding, Steam Boiler and Flywheel Service Bureau accepts 40, Repairs made by electric welding *462
Automatic arc welding machine *548
Automatic compensator for starting induction motors *335
Automatic control for siphon *309
Automatic controller, Emergency, Briggs .. *143
Automatic refrigeration—Refrig. study course, Macintire *840
Automobiles, Ford uses large refrigeration plant in making, Peterson *366
Automotive Engrs., Society of—Paper 177, Discuss the Diesel engine 240, Ed. 230
Averaging pressure charts 273, 307

B

Babbitt metals, Composition and use of, Jarvis *616
Babcock, F. M., Death of 689
Bad example, Copying a, Dixon *949
Ball bearings in steamship engine construction 352
Baltimore County Water & Electric Co.—Combined gas and motor-driven pressure booster station, Walden *950
Barber, C. E., Death of 612
Barometer, Vacuum gage reading referred to ..... ‡395
Batteries, Storage, for emergency service, Welcke *715

Page

Battery, Storage, development 1012
Baumé degrees to specific gravity, Conversion of ..... ‡1059
Baumé system used in the oil trade 468
Be careful 930
Bearing on a small lathe, Method of boring a large *520
Bearings, Lubrication of steam-engine, Osborne *215
Bearings, Thrust—Vertical-shaft waterwheel-driven alternators — Mechanical features, Mortensen *699, Lubricating system and rotor *837, Brakes, ventilation and exciters *953
Belt, Effective pull of ..... ‡479
Belt-lacing rules, Simple, Black 761
Belt, Pumping water with a spiral-spring. 874
Belt transmission, Losses in, Herter 251
Belting, Paper, made in Germany *223
"Better safe than sorry" 306
Bichomate salts as boiler compound, Use of 477
Big stick, The, Strohm *1029
Bigelow, P., Death of 281
Bill, Bonehead, Strohm *791
Bill, Sundry Civil 939
Bissel, Mr., has found another perpetual motion *818
Bit brace, Getting pressure on a *642
Bituminous coal can be stored safely, How, Stoek 522, Ed. 515
Bituminous-coal commission to the President, Reports of the U. S. 595, 597
Bituminous coal, Present high prices of ... 688
Bituminous-coal problem, Senator Frelinghuysen proposes to settle 675
Bituminous coal, Ten hints for the storage of 84
Bituminous consumption, Typical curves of monthly, Smith, Tryon *422, 431
Blackwood, C. K., Death of 119
Blade, Wire scraper made from hacksaw .. *679
Blades, Monel-metal, in destroyer turbines, Rice *908
Blowers, High-speed turbine-driven, Smoot. *450
Blowers—Year's progress in the power field *2, 31

BOILER

See also "Trap," "Water," "Oil," "Stoker," "Furnace," "Gage," "Weld," "Power Plant," "Economizer," "Pump," "Test," "Drafts," "Chart," "Valve," etc.

—American Boiler Mfrs.' Asso.—Season fluctuations in boiler industry *259, Paper *684 (Criticism) 932, Convention *982, Ed. 971
—A. S. M. E. Code—States and cities which have adopted Code *62, (correction 157), *569, Oregon adopts Code 157, 230, Seattle boiler rules amended 157, Maryland to adopt Code 942, Interpretations of Code *1018
—Arch, Shaw monolith suspended boiler. *458
—Baffle-wall mixture, Home-made *345
—Bag in boiler shell, Determining thickness of ..... ‡191
—Bichromate salts as boiler compound, Use of 477
—Blowing down boilers 345
—Blowing off a cut-out boiler ..... ‡311
—Blowoff leakage, More convenient observation of ‡683, Another method 894
—Blowoff lines and valves *110
—Blowoff, Measuring amount of ..... ‡645
—Blowoff pipes 517
—Blowoff water, Salvage of ..... ‡77
—Blowoff water was utilized, How the. *435
—Boiler bagged due to muddy water .. *108, 438
—Boiler feeding system for paper mills .. *266
—Boiler fronts showing underfeed stokers and traveling weighing larry *52
—Boiler, New, plant at the Republic Steel and Iron Co., Rogers *292
—Bridge-wall from boiler shell, Distance of 309, 599, 680, 738, 931
—Burton duplex water-tube boiler *757
—California illustrates some requirements of its boiler law *697, 1013
—Calking, Inside and outside ..... ‡311
—Carrick graduated combustion control—Illustration of operation *773
—Cold-water feed connection for boiler, Separate ..... ‡645
—Combustion chamber, Sloping floor of. ‡1059
—Copes regulator, New *472
—Crack, What caused the? 818
—Damper arrangement, Suggested *737
—Definition, Boiler and stoker ... 982, Ed. 971
—Design, Scientific study of boiler 516
—Dispatching method of operating boiler plant *262
—Dome for 125 lb. working pressure, Riveting of ..... ‡111
—Draft, Equalization of, of boilers set in battery ..... ‡439
—Drip pan, Water-leg *896
—Efficiency, How to improve boiler, Gauss *180
—Essentials, Boiler-room . 273, *477, 784, 1058
—Evaporation, Equivalent, Johnson *28
—Evaporation required per boiler horsepower ..... ‡897
—Explosion at Rockport, Texas *27, Why boilers explode 31, Possible causes of boiler explosions 644
—Explosion, Fatal, at Seattle *444

Page

BOILER—Continued
—Explosion, Frozen safety valve causes boiler 157, *175, 186, Discussion (whole page) 433, 434, Hazards of the human element 639, Possible causes of boiler explosions 644, Freeze-proof mixture in gage siphon 678
—Explosion, The first boiler 1048
—Explosion—Why blame caustic soda for boiler-plate cracks? 677
—Explosions, European 474
—Explosions reduced by competent inspection 516
—Feed waters, Designations of boiler..... ‡977
—Feeding r.-t. boiler through blowoff... ‡683
—Fire-tube boilers, Handholes for vertical. ‡347
—Flue, Size of, for r.-t. boilers ..... ‡1017
—Foaming and priming of boiler..... ‡739
—Fuel and oil boiler efficiency..... 828
—Gaskets, Water-test pressure on handhole ..... ‡785
—Girth seams, Allowance for strength of. ‡605
—Girth seams lapped toward fire..... ‡439
—Grease more dangerous to burning new boilers ..... ‡977
—Grooving of boiler shells ..... ‡1059
—Hand-fired grate, Advantage of inclining ..... ‡935
—Handhole seat, Soldering a. Kurtz.... *139
—Heat in water and steam of boiler, Relative ..... ‡479
—H.-r.-t. boiler, Size of uptake for..... ‡683
—H.-r.-t. boilers, Direction of laps of.... ‡395
—Increasing boiler output 640, By help of a CO_2 recorder 856
—Instrument boards, Boiler-room *228
—Joints, Efficiencies of single lap. Hemingway, Page..... *165
—Joints, Equal width straps for boiler.. ‡153
—Joints, Longitudinal, Maximum length for 148, 272, *392, 474, 643, 783
—Joints, Reduction of plate thickness at circumferential ..... ‡111
—Joints, Reduction of thick plates at girth ..... ‡37
—Kerosene in boilers ..... ‡859
—L Street Station Extension, Boiler-room views in the. Bromley *125
—Lamination, Repairing a boiler-plate, *519, 817
—Laws, Reasonable administration of boiler 72
—Locomotive-type boiler, Flame in smokestack of ..... ‡153
—Marine boiler law, A needed reform in. 733
—Mass. Boiler Inspection Department and Board of Boiler Rules, Reorganization of the 472, Has hearing in Boston ... 863
—Moline Station adds to steam and generating capacity. Wilson *208
—National Board of Boiler and Pressure Vessel Inspectors 558, 569
—New York State industrial code, Proposed amendments to 1060
—Ohio Board of Boiler Rules 41
—Oil as a fuel for boilers and furnaces. Fleming *550
—Oil from new boilers, Removing..... ‡111
—Operation, Efficient, of the boiler plant. Morgan *868, *957
—Operation, Ideal methods of boiler-room 75
—Over the top with the boiler room crew. Cheney *247
—Pipe for boiler feed, Size of 274
—Pitting of boiler, Providing against..... ‡977
—Plugs in water-column connections ... *1014
—Pressure from variable boiler pressure, More uniform ..... ‡191
—Pulverized coal under central-station boilers. Anderson *336, 339, Ed. 341, *354, 681, Comparative cost 783, 855, Comparison of tests 1013
—Rating for difference of pressure, Variation of boiler ..... ‡521
—Riveting patches on cylindrical pressure shells. Hemingway, Page..... *164
—Season fluctuations in boiler industry.. *259
—Settings for r.-t. boilers, Height of ‡235, 517, 777, 819, 931, Misostow *1034
—Single boiler, Confining operations to a. ‡645
—Smoke connection to stack, Provision for ‡821
—Smoke nuisance, Eliminating the 779
—Standardization of boiler plants. Lee... *374
—Statistics, Some boiler, from "The Locomotive" 1037
—Stay-bolt holes, Electrically welded.... *151
—Stays, Advantages of diagonal over head-to-head ..... ‡1017
—Steam Boiler and Flywheel Service Bureau accepts autogenous welding 40, Repairs made by electric welding.... *462
—Stevens-Pratt boiler, Standardization table of. Stevens *836, 853, *879
—Stokers, Mechanical, aboard ship. Bromley *86
—Test of Stirling boilers using wood fuel. *711, 734
—They ought to steam better *394
—Tube ends, Holding power of flared vs. beaded ..... ‡77
—Tube failure of locomotive boiler, Plugged 890
—Tube failures 437, Treating boiler-feed water 437
—Tube sheets, Repairing cracked..... *190
—Tubes in place of angle irons for supporting baffles *682
—Waste-heat and water-tube boilers—Power drives for rolling mills, Rogers... *171, *291, *465, *542, *622, *800, *962
—Water-column blowoff valves *601
—Water, Continuous use of boiler 604, 784
—Water lift when the safety valve blows, Why does the? 232, 269, 307, 343, 642
—Water softening, Hot-process *429
—Water, Treating boiler-feed 437

Page

BOILER—Continued
—Water-tube boilers for wood ships, Emergency Fleet Corp. Dean, Kreisinger *348, Ed. 516
—Water-tube boilers, Neglected parts of. 107
—Water-tube boilers, Refacing caps, nuts and headers of *393
—Welding, Repairs made by electric..... *462
—Year's progress in the power field..... *2, 31
Bolts for removing condenser head, Using. Saller *89
Bonehead Bill, Strohm *791
Bonus—Over the top with the boiler room crew, Cheney *247
Bonuses for Coal Saving, Coal Consumption of Power Plants and. Parsons..... ‡281
Booster station, Combined gas and motor-driven pressure. Walden *950
Boring a large bearing on a small lathe, Method of *520
Boss—If dreams came true *358
Boston Engineers, Dinner of the 570
Boston, Extension to L Street Station. Bromley *124
Bourdon gage spring. Parker *722
Brace, Getting pressure on a bit..... *642
Brake adjustments—Electric elevator machinery. Myers *1038
Brakes, ventilation and exciters—Vertical-shaft waterwheel-driven alternators. Mortensen *953
Brass tubes, Flow of air through small. Taylor *1022
Brasses, Fitting crankrod *1015
Bricks, Approximate melting points of various. Morgan *872, *957
Brine a puzzle, Freezing of 35, 476
Brine system, The—Refrig. study course. Macintire *540
Britain, Amount of gasoline imported from U. S. by 635
Britain trying to secure a world-wide oil supply 892
Britain, Use of oil fuel instead of coal in. 155
Britain, Utilization of tidal ebb and flow in 708, Power from the tide 892
British and American coal-mining conditions, Comparison of 687
British battle cruiser "Hood"—Designed to develop 144,000 hp. 708, 727
British Columbia—Wilful waste makes woeful want 280
British control of fuel oil 763
B.t.u. basis, Purchase of coal on the. Langtry 606
B.t.u. into horsepower, Conversion of.... ‡111
B.t.u., Symbol for *857
B.t.u.'s vs. kw.-hrs. per ton of coal as measure of efficiency 735, 931
Buckle down. Hopley 285
Bureau of Mines—National fuel-inspection system 41, Abatement of corrosion in central heating systems 118, Snow employed in Salt Lake's smoke problem 217, Sampling atmosphere by airplane *279, Explosion hazard from partly consumed coal dust 609, Dr. Van. H. Manning res gns 778, 787, Dr. F. G. Cottrell, new director *827 To develop the commercial treatment of lignite 827, Airplanes for mine rescue work 1012
Bureau of Standards—Experimental retort test of Orient (Ill.) coal 119, Short manometer for measuring high pressures *658, A new high-speed gas-engine indicator *720, Testing engines for 40,000 ft. in the air, McBride *792, Porosity and Volume Changes of Firebricks..... 986
Burnet St. School, Newark, N. J., Sectional elevation and plan views of oil storage and burning equipment *54
Burning fuel oil 518
Burning Illinois coal from vein No. 5, Marsh *1001
Burns when handling lime, Precaution against 73
Burton duplex water-tube boiler *757
Bushel, Lift the 32

C

California, Cost of power development in 787
California, Excerpts from elevator safety orders, State of. Smith 236
California, Gasoline and crude-oil prices advanced in 555, The worm commences to turn 558
California illustrates some requirements of its boiler law *697, 1013
California, Power growth in 184
Canada, Analysis of the central electric station industry in 1023
Canadian Commission of Conservation on Pulverized Fuel ..... ‡83
Canadian Engineers will meet in Montreal. 157
Canadian trade, October electrical exports and 106
Capital—When strikes come *233
Car, Henry Ford's new gasoline driven street 327
Car up incline, Pull and power required to draw ..... ‡1017
Carbon dioxide as a guide to furnace operation, Flue-gas temperature and. Phelps..*725
Carbon dioxide in flue gas when burning oil *103
Carbon dioxide readings, Tables for computing combustion data from *966
Carbon dioxide recording machines, Care of. 784, 1058
Carbon dioxide, Sampling tanks vs. continuous recorders for determining. Phelps... *297
Carbon dioxide—Over the top with the boiler room crew. Cheney *247
Carbon dioxide recorder, Increasing boiler output by the help of a 856
Carbon tetrachloride as a substitute for oil in high-voltage switches 640

Page

Careful, Be 930
Carefulness guards against accident..... *945
Carle, N. A.—A progressive in power-plant construction *728
Carrick graduated combustion control..... *772
Cartoons—Swat the waster *41, Rub-a-dub, two men in a tub *79, Young fireman in the home *117, Something to think about *241, If dreams came true *358, Wanted: A practical man *900, Carefulness guards against accident *945
Casting, Removing a tight pin from a.... *518
Caustic soda for boiler-plate cracks, Why blame? 677
Central America, Repair jobs in *189
Central electric station industry in Canada, Analysis of the 1023
Central-station boilers, Pulverized coal under. Anderson *336, 339, Ed. 341, *354, 681, Comparative cost 783, 855, Comparison of tests 1013
Central Station Directory and Data Book, McGraw ..... ‡525
Central station output in U. S. in 1919.. 256
Central-station plants, Interconnecting industrial and. Weber *1049, 1053
Central station, Proposed $5,000,000..... 118
Central station, Proposed super-power (supplement), Stevens *832, 853, Economies to be expected *879
Central station—Super-power project one of many angles 929
Central station—The year 1919 encouraging regarding power costs 268
Central station to double power-plant capacity, Havana 1024
Central station to supply entire Parisian district 661
Central stations, An operating code for large 387, 856
Central stations—Average of 3 lb. of coal per kw.-hr. 930
Central stations in Canada, Capital invested in 714
Central stations in U. S., Growth of. Morrow *924
Chain and ring shaft lubrication, Merits of 559, 819, 1057
Chain-grate stoker, Developing the.. Gauss. *144, 517
Charleston (S. C.) Consolidated Railway & Lighting Co.—High wages influence power-plant design *917
Chart, CO_2 showing average heat loss for varying CO_2, Phelps *297
Chart—Comparative efficiency of underfeed, overfeed and hand stoking with different rates of firing *113
Chart—Comparison of over-all costs of a 500-kw. and a 30,000-kw. plant *114
Chart—Estimated average total production per working day of bituminous coal including coal coked *1062
Chart for comparing prices of coal and oil to give the same evaporation per dollar. Daniels *684, Criticism 932
Chart for computing allowable pressures in thick hollow cylinders *104
Chart for computing thickness of plate for steel pipe under various conditions. Batcheller *656
Chart for determining proportions of gear teeth McManus, Ehlinger *541
Chart for finding equivalent prices of coal and fuel oil, Evans *638
Chart for finding power factor, Berry..... *795, 816
Chart from CO_2 recorder indicating careful firing on a constant load, Wilkie..... *994
Chart giving quantity of air per pound of fuel and heat lost up stack, Gauss..... *180
Chart, Load, taken on line side of induction motor of flywheel set, etc. Jeffrey..... *1030, 1054
Chart of oil analysis and carbon content. Parish *567
Chart—Relative cost of hand and stoker firing *114
Chart—Season fluctuations in boiler industry *259
Chart showing additional capacity that must be provided in an air pump to remove assumed leakage of dry air into the condensing system, Wheeler *296
Chart showing average CO_2 is not good indication of heat loss, Phelps *297
Chart showing average coal consumption with three economizer conditions *308
Chart showing effect of hydrogen in fuel on heat loss as indicated by CO_2 readings.. *966
Chart showing the variation of viscosities under different temperatures, Osborne.. *68
Chart showing vaporization temperature of steam for pressures less than atmospheric *817
Chart—Supercharging Diesel engines, Ruegg.*712
Chart to determine coal required per season to heat 1,000 cu.ft. of air per min. Alden *93
Chart to determine per cent of heat loss from flue-gas analysis, Brayton *129, Loss due to excess air 264, 681
Chart—Viscosities of some well-known turbine oils, Osborne *324
Charts, Averaging pressure 273, 307
Charts, CO_2 recorder, from boiler under constant load and boiler controlled by governor *780
Charts for graphical determination of pipe sizes and velocity of flow of steam, Brayton *662, *762
Chicago, East—Frozen safety valve causes boiler explosion 157, *175, 186, Discussion (whole page) 433, 434, Hazards of the human element 639, Possible causes of boiler explosions 644, Freeze-proof mixture in gage siphon 678

605 P54 v.51 pt.1

Page

Chicago, New Sinclair boiler plant at East..*576
"Chief, The"—Keeping out of the rut.... 934
Chile Exploration Co.'s Tocopilla power plant. Thomas *492, 515
Chimney, Brick, near Sudbury, Ont..... 371
Chimneys, Smokeless, not conclusive proof of furnace economy 33
Chord factor .....‡153
Chronic grouch, The. Strohm *47, Two-faced Tom *491
Cincinnati, Ohio—Power and refrigeration for model ice cream and dairy plant..*752
Circuit, Testing on a grounded. Parham...*593
Circuits, Ground detectors for d.-c. and a.-c. Gillooly *508
Clamp for high-pressure hose *520
Clock-pendulum precision speed limit.....*890
CO_2. See "Carbon dioxide."
Coal, A Study of the Forms in Which Sulphur Occurs in. Powell, Parr..... †84
Coal and oil as fuel, Comparative value of. 98
Coal and oil, Comparative evaporative values of 198
Coal and oil fuel, Relative value of. Evans *637
Coal and power activities, Geographical distribution of 899
Coal as measure of efficiency, B.t.u.'s vs. kw.-hrs. per ton of 735, 931
Coal, Attention to little things saved..... 309
Coal available in Ireland, Amount of..... 165
Coal, Banking fire with coarse .....‡439
Coal commission to the President, Reports of the U. S. bituminous 595, 597
Coal conservation, A captain of *549
Coal—Conservation the only way left to meet the fuel situation 853
Coal consumed by public utilities 569
Coal consumption in institutional heating plants. Nichols *654
Coal consumption in U. S., Growth in annual. Morrow *922
Coal Consumption of Power Plants and Bonuses for Coal Saving. Parsons....†281
Coal deposit discovered in Chile..... 262
Coal, Determination of volatile matter in. 149
Coal dust, Explosion hazard from partly consumed 609
Coal economy per kilowatt-hour, Percentage improvement in .....‡275
Coal, Experimental retort test of Orient (Ill.) 119
Coal, Exports of American 252
Coal famine, Beating the 608
Coal, Flue gas produced by perfect combustion of *103
Coal from the mines, Alberta, Can., investigating possibilities of waste 742
Coal from vein No. 5, Burning Illinois. Marsh *1001
Coal handling at the McKeesport Tin Plate Co.'s plant, Novel *178
Coal-handling facilities at Cos Cob, Improved *546
Coal have you, How much? 972
Coal, How bituminous, can be stored safely. Stoek 522, Ed. 515
Coal in a year, New York lighting companies use 3,453,408 tons of 926
Coal including coal coked, Estimated average total production per working day of bituminous *1062
Coal industry profits 1023
Coal industry, Stabilization of the bituminous 387
Coal is gone, When the 106
"Coal Is King"—Free copies 1060
Coal mines in France, Destruction by the Germans of 193
Coal-mining conditions, Comparison of British and American 687
Coal, Oil fuel vs. Myers 352
Coal on the B.t.u. basis, Purchase of, Langtry 606
Coal or oil fuel for refrigerating plants? Porter 889
Coal—Our power wastes 854
Coal per kw.-hr., Central stations give an average of 3 lb. of 930
Coal, Present high prices of bituminous... 688
Coal problem, Senator Frelinghuysen proposes to settle the bituminous 675
Coal production, Fluctuations in—Their extent and causes. Smith, Tryon....*422, 431
Coal production in Washington decreased by the miners' strike 743
Coal. Pulverized. See also "Pulverized." "Fuel."
Coal, Pulverized, under central-station boilers. Anderson *336, 339, Ed. 341, *354, 681, Comparative cost 783, 855, Comparison of tests 1013
Coal, Regional power development and the low-temperature distillation of 824 Ed.. 815
Coal regions of the country, Car situation in the soft 940
Coal required per season to heat 1,000 cu. ft. of air per min., Chart to determine Alden *93
Coal requirements of the Navy 900
Coal saving—Interconnecting industrial and central-station plants Weber...*1049, 1053
Coal—Secretary Lane's recommendations.60, 71
Coal shortage, Assistance in cases of..... 985
Coal shortage in Germany 548
Coal situation, Notes on the..1003, 1012, 1025, 1026
Coal situation, Public utility companies side of the 399
Coal—Smokeless chimneys not conclusive proof of furnace economy..... 33
Coal supply in summer is still important, Storage of winter 778
Coal, Ten hints for the storage of bituminous 84
Coal, Three power-plant leaks that waste. Smith 627, 976

Page

Coal trade operated at a loss, Vessels in New England 252
Coal trade, Study course for the..... 687
Coal, Vertical shaft being driven to a 7-ft. vein of—West Penn Power Co..... 184
Coal—Will we have to come to the big stick again? 1053
Coal—Year's progress in the power field..*2, 31
Coals, The fusibility of ash from Eastern.*437
Cock, Too much regrinding of stop.....*682
Code, Another reason for an operating.... 733
Code for large central stations, An operating 387, 856
Coils, Cooling, for water-cooled transformers.924
Combined Engineering and Supply Co.—Magnet-type pocket lamp *381
Combustion at low speeds with semi-Diesel engine 458
Combustion, Calculations from a flue-gas analysis of loss due to incomplete. Brayton *129, Loss due to excess air.... 264, 681
Combustion chamber, Sloping floor of...‡1059
Combustion control, Carrick graduated....*772
Combustion data from CO_2 readings, Tables for computing *966
Combustion engineer—Joseph Harrington..*813
Combustion Engineer, Opportunities for the .....†1026
Combustion expert—Osborn Monnett ...*1047
Combustion of coal and of oil, Flue gas produced by perfect *103
Combustion of fuel oil, Economical.....*780
Combustion of fuel oil, Elements of..... 333
Combustion of gasoline, Properties and products of the 165
Combustion—Washery sludge burned in pulverized form at Seattle 729
Commercial Register, Hendricks .....†446
Commutator under difficulties, Repairing a.*108
Compensator, Automatic, for starting induction motors .....*.335
Compound, Use of bichromate salts as boiler 477
Compressed-spruce pulley *885
Compression, Ammonia. See "Refrigeration."
Compressor, Air. See "Air."
Concrete fuel-oil tank, 15,000-gal.....*619
Concrete, Material for reinforcing .....‡977
Concrete, Number of cubic yards in block of .....‡191
Concrete, Reinforced, for stator frames ... 148
Concrete, Reinforced—Moline Station adds to steam and generating capacity. Wilson *208
Condensed-clipping index of equipment.... *112, *278, *353, *564, *860

CONDENSER, AMMONIA

See also "Refrigeration."
—Ammonia condenser, The—Refrig. study course. Macintire *301
—Ammonia condensers, Connections of primary and secondary. Wilkie *993
—Cleaning the double-pipe ammonia condenser. Solomon *169
—Tank won't work, Believes purge..... 73

CONDENSER, STEAM

See also "Heater."
—Air pumps for condensing equipment. Wheeler 195
—Corrosion of condenser tubes 786
—Corrosion research 929
—Drain trenches in pump and condenser pits 310
—Heads from small condensers, Removing. Saller *89
—Steam condenser, cooling tower and primary ammonia condenser. Wilkie...*993
—Steam-jet air pumps for condensers. Taylor *995
—Tubes, Prolonging the life of condenser. Walton *588, 976
—Wheeler auxiliary tube-plate condenser. New *227
—Year's progress in the power field.....*2, 31
Coils, Tools for removing *346
Color schemes for plant piping. Wilkinson. 610
Connecticut Light and Power Co.—Details of the Waterbury turbine explosion.....*633
Connors Creek plant—Turbine installed in record time *372
Conservation the only way left to meet the fuel situation 853
Control, Carrick graduated combustion....*772
Controller, Emergency automatic. Briggs...*143
Conventions and what we can get out of them 1011
Converters and generators, Change in the design of rotary 137
Cooling water—Refrig. study course. Macintire *1004
Copes regulator, New *472
Copying a bad example. Dixon *949
Corrosion in central heating systems, Abatement of 118
Corrosion of condenser tubes 786
Corrosion research 929
Cos Cob, Improved coal-handling facilities at *546
Cost of hand and stoker firing, Relative..*114
Cost of low power factor. Brown *24
Cost per pound of steam, Reporting average .....‡311
Costs—Electrical maintenance records..... 147
Costs—Favors the oil engine 858
Costs—Furnace and stoker maintenance charges with regard to age. Morgan....*961
Costs of a 500-kw. and a 30,000-kw. plant, Comparison of over-all *114
Costs per ton, Electrical operating, etc....*862
Costs, Plant operating records and..... 277
Costs, Power, at tidewater and at switchboard of 100,000-kw. steam-turbine plant. Stevens *881

Page

Costs, Power, to increase and not decrease.. 185
Costs, The year 1919 encouraging regarding power 268
Coupling, Use of flexible .....‡191
Court decisions, Street 20, 36
Cracks, Circumferential, in crankshafts... 736
Crane, A handy shop *679
Crankpin, Average tangential pressure on..‡605
Crankpin clearance, Measuring Diesel-engine. Morrison *20
Crankpins and loose cranks, Loose—Steam-engine operation and maintenance. Hamkens *805
Crank-rod brasses, Fitting *1015
Crankshaft diameter, Enlargement of.....‡347
Crankshaft into alignment, Springing a 15-ton *76
Crankshaft on a cross-compound engine, Truing a bent *974
Crankshafts, Circumferential cracks in.. 736
Crude oils, Relationship between specific gravity and heating value of 16
Cuba, Model small ice plant in, Kilian..*248
Cup as wick-feed oiler, Using compression grease *33
Current, Record of, taken by synchronous motor, etc. Mortensen *92, *603
Curtis turbines, Shaft governors of small *328, Governors of 75- to 3,000-kw. Curtis turbines. Bromley *414
Curves, Comparative fuel-consumption. Blakely *39
Curves for estimating the size of synchronous motor to install. Brown *24
Cutoff, Necessity of unequal laps for equalizing .....‡859
Cylinder drain arrangement *189
Cylinder-oil testing methods, Better.....*389
Cylinder, Steam, lubrication, Osborne.... 140
Cylinders, Allowable pressure in thick hollow *104
Cylinders, Discharge of condensate from drying .....‡821
Cylindrical pressure shells, Riveting patches on, Hemingway, Page *161
Cylindrical tanks, Capacity of .....‡153
Czecho-Slovakia, Hydro-electric development in 83

D

"Dad" goes after the chief's job, When..*319
Dalton's law applied to air-pump capacities. Wheeler *296
Dam, Precautions to observe when operating gates at a. Wyss 222
Damper arrangement, Suggested.....*737
Data of results wanted 781
David Ranken School, Larkin fund to.....1025
Davis, H. M., Death of 358
Dawn of a new day 972
Daylight, Artificial, achieved 118
De Pere-Burton duplex water-tube boiler..*757
Deaths, Number of accidental—"Better safe than sorry" 306
Definitions, Boiler and stoker, 982, Ed... 971
De Laval shaft and emergency governor.... *21
Demagnetizing a watch..... 308
Denmark—Supply from central stations...1010
Design and Construction of Heat Engines. Ninde .....‡525
Diagram, A steam alignment *1045
Diagram, Heat-flow *113
Diagram, Indicator—Foreword cartoon....*365
Diagram, Measuring an indicator *590
Diagram of signal system, Connection.....*74
Diagram, Unaflow-engine indicator *263
Diagrams of induction-motor windings, Connection. Dudley *56
Diagrams, Voltage vector. Dudley *327
Diamond Power Specialty Co.—Free copies of "Coal Is King" 1060
Diesel-electric equipment of the yacht "Elfay" *452
Diesel engine, Automotive Engrs. discuss the 240, Ed. 230
Diesel-engine crankpin clearance, Measuring. Morrison *20
Diesel-engine driven ship in the world, "Africa" largest 970
Diesel engine, The 199
Diesel-engine trouble, Regarding..... 149
Diesel Engine-Users Ass'n..... 524
Diesel engineer, Don'ts for the 1033
Diesel engines, Operating *933
Diesel engines, Suggested changes for..... 858
Diesel engines, Supercharging Ruegg *712
Diman, Geo. H.—Power plant pioneer....*383
Do your own thinking! Carpenter..... 615
Door, Smith, protectors *304
Drafts on boiler operation, Effect of, Morgan *872, *957
Drain trenches in pump and condenser pits. 310
Dreams came true, If *358
Drilling—Getting pressure on a bit brace..*642
Drip pan, Boiler waterleg *896
Drive, Sawmill, in the Pacific Northwest.. 733
Drives, Electric motors for pulp and paper machinery. Easton *584
Drives, Electrical, for lumber mills. Franklin *536
Drives, Electrical, for steel mills..... 115
Drives for steel mills, Steam vs. electric main-roll 80, *861
Drives, Power, for rolling mills. Rogers. *17, *95, *171, *291, *465, *542, *622, *800, *962
Drum, Steam—Relative pressure for convex and concave heads .....‡37
Drums, Steam—Triple riveting of lap joints .....‡521

E

Earth, Steam from the.....*70,*889
Eccentric, Designing angle of advance of..†1059

Page

Economical power production, An expert in—Foster McKenzie of Cleveland Ohio ....•512
Economizer connection to smoke flue. Rogers ....•294
Economizer expert addresses Heating and Ventilating Engrs. 687
Economizer explosions.... 568
Economizer, Fuel savings by the.....•308
Edison Electric Illuminating Co.,—Extension to L Street Station, Boston. Bromley.•124
Edison Medal presented to Wm. Le Roy Emmet ....•901
Educational institution and industry, Cooperation between 267, New plan.. 474
Efficiency engineer, Every man an 123, Every man not an efficiency engineer 438
Elastic Strengths of Steel in Tension, Compression and Shear, Relation between the, Seely, Putnam....†788
Electrical exports and Canadian trade, October 106
Electrical machinery, Value of domestic exports of 65
Electrical mantenance records.... 147

ELECTRICITY

See also "Power Plant" and cross references therefrom, etc. For hydro-electric plants see "Water power."
—Accidents, Fatal, on low-voltage circuits 341, 856
—Alarm clock used to open oil switch automatically ....•601
—Alternating current came into use, How 25-cycle 303
—Alternator, Rotation direction of.....‡683
—Alternator to lose field control, Grounds cause ....•855
—Alternators, Changing voltage of.....‡395
—Alternators having opposite polarity in parallel, Operating two similar. Briggs. •810, 816
—Alternators, Turbine-driven vs. engine-driven—I. Mortensen ....•330, II,•425, III, •469
—Alternators, Vertical-shaft waterwheel-driven—Mechanical features. Mortensen •698, Lubricating system and rotor •837, Brakes, ventilation and exciters ....•953
—Alternators when they rotate in opposite directions, Paralleling two. Briggs...•886
—American Inst. Elec. Engrs.—Midwinter convention 200, 398, Meet in Pittsburgh 399, Paper •440, Ed. 431, Boston meeting 443, Presidential address 523, Paper 708, Committee on Super-Power System 758, Orville Wright presented with John Fritz Medal 823, Discussion on regional power development, etc., 824, Ed 815, Elects officers 900, Edison Medal presented to Wm Le Roy Emmet •901, Annual convention 940
—Ampere-turns in field coils 976
—Arctic regions, Electric power in the...•666
—Armature, Faulty soldering caused trouble on d. c. ....•107
—Armature Winding and Motor Repair. Braymer ....†612
—Armature without removing it from frame, Banding an ....•1056
—Armatures, How to locate faults in d.-c. Darter ....•660
—Batteries, Storage, for emergency service. Welcke ....•715
—British battle cruiser "Hood"—Electric-power generating equipment 708, 727
—California, Cost of power development in 787
—California, Power growth in 184
—Carbon brush wear ....‡347
—Motors were controlled in parallel, How two a.-c. Grant ....•1006
—Carbon tetrachloride as a substitute for oil in high-voltage switches 640
—Chord factor....‡153
—Circuit, Testing on a grounded. Parham ....•593
—Coils, Locating defective field .....•269
—Commutating-pole motor trouble .....•346
—Commutator mica segments, Templet for cutting. Harris ....•635
—Commutator under difficulties, Repairing a ....•108
—Controller, Emergency automatic. Briggs.•143
—Controllers for Electric Motors. James..†525
—Converter, Inverted ....‡645
—Converters and generators, Change in the design of rotary 137
—Dead-ending conductors to floor timbers. Turner ....•928
—Demagnetizing a watch 308
—Diesel-electric equipment of the yacht "Elfay" ....•452
—Drive, Economy of electric 612
—Drives, Electrical, for lumber mills. Franklin ....•536
—Drives for steel mills 115
—Drives for steel mills, Steam vs. electric main-roll ....80, •861
—Drying out a generator, switchboard and motors after a flood. Reed .....•250
—Economical supply of electric power.... •440, Ed. 431
—Electrically driven steel reversing mills. Jeffrey ....•1030, 1054
—Electrically operated pumping plants in Indiana 276
——Electricity is a luxury, Where 305
—Elevator cage, Velocity acquired by drop of ....‡235
—Elevator inspection, What constitutes proper? Gitto ....607, Ed. 598
—Elevator machinery, Electric—Motor operation. Myers •920, Brake adjustments ....•1038

Page

ELECTRICITY—Continued
—Elevator safety orders, State of California, Excerpts form. Smith..... 236
—Elevators, Care and maintenance of plunger hydraulic. Burgess .....•101
—England adopts American industrial policies 335
—Explosion of motor-generator set in the Toledo Railway and Light Co.'s plant.•485
—Exports of electrical machinery from U. S., Value of, Oct., 1919, 65, Jan., 1920, 608, Feb., 742, Mar.... 836
—Frequency changer, Starting a .....•975
—Frequency shall be adopted as standard, What? 388
—Fuel efficiency in power production in different states. McBride •386, B.t.u.'s vs. kw.-hrs. per ton of coal as measure of efficiency. Misostow 735, McBride 931
—Fuse puller, Handy .....•389
—Gadsden-Huntsville extension 83
—Gasoline electric-generating sets 106
—Generator shafts, Lining turbine and. Patterson ....•371
—Generator, Water power available for electric ....‡859
—Generator windings, Cleaning apparatus for. Williams ....•878
—Geographical distribution of coal and power activities 899
—Ground detectors for d.c. and a.c. circuits. Gillooly ....•508
—Ground indicators deceived, When the.•343
—Ground on motor circuit, Wet floor caused 519
—Grounded neutral 734
—Hoists, Electrically driven. Jeffery ..•286
—Induction and synchronous motors for industrial applications. Drake..... 822
—Induction-motor end rings melted .....‡563
—Induction-motor rotor connections....‡1017
—Induction motor Starting an .....‡605
—Induction motor to hum, Loose bolts caused 234
—Induction-motor trouble and how it was remedied ....•974
—Induction-motor winding bracing .....‡521
—Induction motors, Automatic compensator for starting ....•335
—Induction motors, Locating faults in—Noise and vibration. Dudley •299 Most common defects •325, How to make tests ....•453
—Induction motors, Reconnecting—Reconnecting problems. Dudley .... •55
—Induction motors, Removing retaining wedges and coils from ....•346
—Insulation, Moisture in 157
—Interconnecting industrial and central-station plants. Weber .....•1049, 1053
—Japan Electric undertakings in .... •40
—Lamp, Magnet-type pocket .....•381
—Lightning arrester, Oxide-film .....•956
—Meter connections, Increasing length of.‡439
—Meter rates, Standard—Basis of development. Allison 183, 186, How applied in calculating power bills •218, Demand rates ....•257
—Meter read, What does the? .....•641
—Meter readings—Keeping out of the rut. 268, 270, 602, 934
—Meter records and their interpretation, Graphic. Hamilton ....•803
—Metering problem, A freak •561, Another ....•1057
—Metering problem, An interesting ....•390
—Meters Testing polyphase watt-hour. Findley ....•875
—Motor, Adjustable-speed, equipment for rolling mills. Jeffery ....•408
—Motor, Balancing fuel, lubricant and. Parish ....•565
—Motor cutout, Off-peak schedule .....•392
—Motor field coils burn out .....‡859
—Motor to flash over, Field winding in opposition caused ....•231
—Motor trouble was caused by brush-contact resistance 151
—Motors driving pumps and compressors, Automatic control for. Jones.....•498
—Motors, Electric, for pulp and paper machinery drives. Easton ....•584
—Motors for driving ventilating fans. Easton ....•759, 777
—Motors, Lubrication of electric. Osborne 378
—Motors on 550-volt service, Operating 220-volt ....•188
—Motors, Reinsulating series winding of compound-wound ....•436
—Motors to start, Investigating failure of d.-c. Parham ....•628
—National Elec. Light Asso.—Paper 82, Operating code for large central stations 387, 856, Convention 524, 609, Another reason for an operating code 733, Reorganization plan 742, Sidelights on convention 743, Program •745, Prime Movers Committee report on steam- turbines 898, New officers 902, Cooling coils for water-cooled transformers •924, Pressing problems discussed at Pasadena Convention 936, R. H. Ballard, past president •939, M. Insull, president •940, The dawn of a new day 972, Papers 1020, 1025
——National Electrical Code, Revision of, 649, 676
—New England, Electric service in 820
—New York lighting companies use 3,453,408 tons of coal in a year.... 926
—Operating a 220-volt plant from 500-volt service ....•34
—Pennsylvania Electric Ass'n discusses power factor 744, Paper 822, Harrisburg meeting 981
—Power and refrigeration for model ice cream and dairy plant ....•752

Page

ELECTRICITY—Continued
—Power costs to increase and not decrease 185
—Power development and suggestions for future progress, A study of. Morrow ....•922
—Power factor affects the voltage regulation of an alternator. How? Graham.•379
—Power factor, Chart for finding. Berry •795, 816
—Power factor, Combined ....•‡563
—Power-factor correction an economic issue 891
—Power factor, Cost of low. Brown... •24
—Power factor, Explanation and measurement of. Todd ....•224
—Power factor in a 3-phase circuit.....‡605
—Power-factor indicator connections, Watt-meter and. Yeaton ....•846
—Power factor of an unbalanced load...‡859
—Power factor, Pennsylvania Electric Ass'n discusses 744
—Power factor, Preventing vs. correcting low 229
—Power-factor synchronous motor, Unity. Berkshire ....•850, 854
—Production of electric power and consumption of fuel 826
—Production of electric power and consumption of fuel by public utility power plants in the U. S., for Feb., Mar,, Apr., and July, 1919, 312. For Jan., Feb., and Mar., 1920 1045
—Propelling machinery for U. S. S. "Tennessee," Sykes ....•413
—Propulsion, Electric, to do away with tugboats 98
—R. K. pressure regulator ....•888
—Reactive factor ....‡275
—Reactive factor, Explanation and measurement of. Todd .....•620, 639
—Rectifiers, Mercury arc 421
—Reducing noise and vibrations. Rankine 580
—Regional power development and the low-temperature distillation of coal..... 824, Ed. 815
—Relays, Overload—Principles of operation. Todd ....•131
—Relays, Protective and service-restoring. Todd ....•912
—Relays, Reverse-current, installed on emergency service ....•36
—Resistances in series and parallel....•394
—Rotary converters in parallel .....‡1017
—Rotor for a squirrel cage, Substitution of a slip-ring ....•188
—Seattle's municipal stations' capacity to be increased 772
—Shocks between the nozzle of hose and circuit, Danger of 76
—Signal system for use in place of telephone .... •74
—Single-phase load on a 3-phase power system, Gibbs ....•552
—Sixty-cycle systems predominate 930
—Slotting commutators in a lathe ....•679
—Soldering iron, An electric-arc. Briggs.•545
—Standardization in electrical power systems, Lack of—Not so badly off as we might be 640
—Starting-compensator oil .....‡347
—Steam from the earth in Italy....•70, •889
—Supply scheme for the north Midland counties 16
—Switch, Safety motor-starting ..... •65
—Switches, Installing disconnecting ....•150
—Synchronous-motor applications. Berkshire ....•166
—Synchronous motor is caused to pull out, What happens when a? .....274, •893
—Synchronous motor, Size of .....‡935
—Synchronous-motor trouble 75
—Synchronous motors for driving centrifugal pumps. Mortensen ....•90, •603
—Transformer bank, Open connection in.•‡235
—Transformer connections, Three-phase power from single-phase. Gibbs....•672
—Transformer-loss eliminator, A .....•973
—Transformer, Repairing a shell-type. Reed.•723
—Transformers, Cooling coils for water-cooled 924
—Transformers, Fire hazard in 1025
—Transformers, Large 945
—Transformers on 60 cycles, Twenty-five-cycle ....‡521
—Transformers operate, How three-phase, Gibbs ....•1002
—Transformers, Preventing sludging of oil in ....•811
—Transmission today, Use of high-voltage 16
—Turbo-alternators, Cooling of 473
—Unsoldering leads from commutator. Briggs ....•656
—Voltage, Choke-coil ....‡439
—Voltage regulation, Location of secondary relays affect 520
—Voltmeter, Extending the range of.....•307
—Water, Electrical conductivity of.....‡645
—Wattmeters require adjustment .....‡821
—Welded Electrically, stay-bolt holes ..•151
—Welding machine, Automatic arc ....•548
—Welding, Repairs made by electric....•462
—Welds, Electric arc vs. gas 604, 934
—World's, One of the, largest steel-mill electrical equipments 445
—Year's progress in the power field ....•2, 31
Electrification of the railroads—Secretary Lane's recommendations 60, 71
Elevator inspection, What constitutes proper? Gitto .....607, Ed. 598
Elevator machinery, Electric—Motor operation. Myers •920, Brake adjustments.•1038
Elevator safety orders State of California, Excerpts from. Smith 236
Elevators, Care and maintenance of plunger hydraulic. Burgess .....•101
"Elfay," Diesel-electric equipment of the yacht ....•452

Page

Emergency Fleet Corp. water-tube boilers for wood ships. Dean, Kreisinger ... *348, Ed. 516
Emmet, Wm. Le Roy, Edison Medal presented to ... *901
Employees, Organized power-plant ... 1016
ENGINE, INTERNAL COMBUSTION. See also "Valve," "Piston," "Flywheel," "Ring," "Oil," "Indicator" etc.
—Accidents, Notes on Gas and Oil Engine. †788
—Airplane—New machine developed by P. C. Hewitt ... 277
—Airplane, Sampling atmosphere by ... *279
—Balancing fuel, lubricant and motor. Parish ... *565
—Compression of fuel mixture before ignition ... 464
—Crankshaft into alignment, Springing a 15-ton ... *76
—Crankshaft, Circumferential cracks in ... 736
—Diesel-electric equipment of the yacht "Elfay" ... *452
—Diesel engine, Automotive Engrs. discuss the ... 240, Ed. 230
—Diesel-engine crankpin clearance, Measuring. Morrison ... *20
—Diesel engine, The ... 199
—Diesel-engine trouble, Regarding ... 149
—Diesel Engine-Users Ass'n. ... 524
—Diesel engines, Operating ... *933
—Diesel engines, Suggested changes for ... 858
—Diesel engines, Surcharging. Ruegg ... *712
—Don'ts for the Diesel engineer ... 1033
—Fuel, A new artificial? ... 816
—Gas, Combined, and motor-driven pressure booster station. Walden ... *950
—Gas engine, Cleaning water jacket of ... ‡897
—Gas-engine-driven blowers—Power drives for rolling mills. Rogers ... *465, *542, *622, *800, *962
—Gas-engine indicator, A new high-speed. *720
—Gas-steam unit shows 72.4 per cent thermal efficiency at Ford Works. Royer ... *532, 649
—Gasoline, Properties and products of the combustion of ... 165
—Gasoline substitute makes good showing. 94
—Hvid engine and its relation to the fuel problem. The. Blakely ... *38
—Kerosene as a fuel for high-speed engines. Sean ... *154
—Lubrication of internal-combustion engines. Osborne ... 590
—New association Needed, a ... 306
—Nuts, Effect of loose, on connecting-rod bolts ... *839
—Oil engine, Favors the ... 858
—Oil-engine piston head repaired, Fractured ... *109
—Oil to run, Starting the ... 601
—One pound per horsepower ... 891
—Piston-rod ends worked loose ... *35
—Piston would not come out, Why the .. *518
—Semi-Diesel engine, Combustion at low speeds with ... 458
—Semi-Diesel engines, Light-load running device for ... 118
—Solid injection oil engine ... 1036
—Testing engines for 40,000 ft. in the air. McBride ... *792
—Tests on connecting-rod bolts of Diesel engine ... 201
—Valve failure and valve steels in internal-combustion engines. Aitchison .. 396
—Valve-timing mechanism, Adjustment of. Snow ... *968
—Year's progress in the power field ... *2, 31
Engine room, Safety first for the. Ray ... 686
ENGINE, STEAM. See also "Valve," "Flywheel," "Bearings," "Crankpin," "Governor," "Piston," "Lubrication," "Indicator" "Coal," etc.
—Angle of advance and lap for double-eccentric engine ... †785
—Ball bearings in steamship engine construction ... 352
—Blowing engines—Power drives for rolling mills. Rogers ... *465, *542, *622, *800, *962
—Click in engine with a particular pressure ... ‡37
—Compound engines, Cylinder oils for ... ‡897
—Compression of exhaust on Corliss engine, Obtaining ... ‡521
—Condensing, Increase of power by operating ... ‡683
—Corliss engine, Click in ... 603
—Corliss engine, Reducing speed of ... ‡897
—Corliss engine, Setting safety cams of .. ‡739
—Corliss valve stems, Replacing ... ‡153
—Crank-rod brasses, Fitting ... *1015
—Crankshaft on a cross-compound engine, Truing a bent ... *974
—Cycle, A proposed improvement in the steam-engine ... *975
—Cylinder liners ... *562
—Cylinders, Sizing bushing for engine .. ‡479
—Design, Peculiar engine ... *438
—Eccentric, Angle of advance of ... ‡645
—Engine running twenty years ... 343
—Exhaust valves with engine on center, Position of ... ‡605
—Flywheel failure is harmless ... *583
—Four-valve engine, Advantages of ... ‡683
—Four-valve engines, Advantages of ... ‡395
—Front and back end and forward stroke. ‡897
—Fuel energy realized by engine, Percentage of ... ‡739
—Gas-steam unit shows 72.4 per cent thermal efficiency at Ford Works. Royer ... *532, 649
—Governor, Loose setscrew stopped ... 784
—Governors, Some characteristics of shaft. Myers ... *845
—Guide arrangement, Engine adjustable .. *189
—Guides, Testing parallelism of engine .. ‡77

Page

ENGINE, STEAM—Continued
—Harrisburg dual-clearance engine ... *513
—Indicator, Wants a continuous ... 108
—Leads, Equal, and inequality of cutoff .. ‡645
—Lubricating an engine under varying load conditions ... 478
—Lubrication of steam-engine bearings. Osborne ... *215
—M.e.p. of engine for generation of stated kilowatt load ... ‡311
—M.e.p., Required, for generating stated kw. ... ‡479
—Old engine dismantled, installed 69 years ago ... 1001
—Overhauling and aligning the engine. Airey ... *764
—Piston, Loose, caused knock ... *394
—Piston would not come out, Why the. *1014
—Ratio of expansion ... ‡897
—Rules for the safe operation of steam engines and turbines, Clock ... 732
—Running over or under ... ‡311
—Steam-cylinder lubrication. Osborne ... 140
—Steam-engine operation and maintenance —Loose crankpins and loose cranks. Hamkens ... *805
—Steam pipe for engine, Size of ... ‡479
—Steam rate with increased back pressure ... ‡347, 783
—Superheated steam—Why not? ... 33
—Superheating with reciprocating engines. 895
—Turbine-driven vs. engine-driven alternators—I Mortensen *330, II *425, III ... *469
—Uniflow engine, The ... *263
—Valve setting, Remedy for present ... 34, 74, 187, *271
—Year's progress in the power field ... *2, 31
Engineer, Every man an efficiency 123. Every man not an efficiency engineer .. 438
Engineer—If dreams came true ... *358
Engineer, Opportunities for the Combustion ... †1026
Engineer, Social function of the ... 117
Engineer, The, to participate in public affairs ... 523
Engineer—When he applies for his first job ... *531
Engineering as prosperity insurance. Smith ... 480
Engineering, Elements of Steam and Gas Power. Potter ... †788
Engineering Experiment Station—A Study of the Forms in Which Sulphur Occurs in Coal. Powell, Parr †84, Scarcity of men for an essential branch of industry 148, Measuring flow of water by orifice. Davis, Jordan ... *238
Engineering Index ... 1026
Engineering, Mechanical—The human element ... 186
Engineering positions—Lift the bushel ... 32
Engineering publicity, New ... 155
Engineering-research work—Scarcity of men for an essential branch of industry ... 148
Engineering service Outlook for ... 118
Engineering societies Future organization for "Welfare" activities of ... 279
Engineering societies Publicity for ... 516
Engineering societies—Year's progress in the power field ... *2, 31
Engineering specialists, Shortage of ... 115
Engineering students—The training of leaders ... 675
Engineer's ability—"Jim could start it, dad. He keeps the motors at the power house going." ... *907
Engineers. See also "International," "Association," "American," "Canadian," "Automotive," "Naval," "Marine," "Society," "Pennsylvania," "Western," "Federated."
Engineers, Amer. Soc. Mech.—Paper *38, States and cities which have adopted Code *62, (Correction 157), *569, Paper *81, Ed. Industrial unrest 105, Worcester Section A. S. M. E. discusses industrial power *113, Ontario (Can.) meeting 117, Papers *154, *156, Oregon adopts Code 157, 230, Seattle boiler rules amended 157, Papers 195, 198, 199, Chicago Section discusses lubrication 200, Paper *348, Ed. 516, Papers 525, *565, Dr. J. A. Brashear, past president, dies *646, Spring meeting 649, Dr. A. C. E. Rateau, honorary member 787, Recommends standard shafting sizes 814, St. Louis meeting 941, Ed. 930, Maryland to adopt Code 942, New professional sections 946, Paper 985, Interpretations of Code *1018, Paper *1022, Engineering Index 1026, "The Great St. Lawrence" 1060, Fuel Section ... 1062
Engineers, Contributory negligence of. Street ... 20
Engineers, In charge of the. Woodwell 686
Engineers loyal, New York ... 80
Engineers, The need of competent 561, 737
Engineers who use turbines should have a voice in their design ... 557
Engineers' influence in public utilities 611
Engineers' license law, National ... 234, 434, 784, 976
Engines, Design and Construction of Heat. Ninde ... †525
Engines Examples in Heat and Heat. Peel †689
England adopts American industrial policies ... 335
England—Fatal accidents on low-voltage circuits 341, 856, Economizer explosions 568
England—Lack of standardization in electrical power systems ... 640
Equipment, Condensed-clipping index of *112, *278, *353, *564, *860
Equipment out-of-doors, Installing ... 854
Equipment vs. men. Beard ... *85

Page

Equivalent evaporation, Johnson ... *28
Erie Lighting Co.—12-in. high pressure underground steam main ... *925
Ether manufacture—Carrying of matches or other flame-producing device not allowed. 256
Evaporation, Equivalent. Johnson ... *28
Evaporative, Comparative, values of coal and oil ... 198
Evaporators, Kestner—Steam from the earth in Italy ... *889
Example, Copying a bad. Dixon ... *949
Examples in Heat and Heat Engines. Peel. †689
Exhaust. See "Steam."
Expansion, Ratio of ... ‡897
Expert in economical power production—Foster McKenzie, of Cleveland, Ohio ... *512
Explosion hazard from partly consumed coal dust ... 609
Explosion. See "Boiler," "Flywheel," "Refrigeration," "Electricity," "Economizer," "Turbine, Steam," "Piping," "Piston."
Export of electrical machinery—Year's progress in power field ... *2, 31
Exports and Canadian trade, October electrical ... 106
Exports, Domestic, of pumps and pumping machinery, to Oct. 1919 ... 197
Exports, during Oct. 1919, of air-compressing and refrigerating machinery ... 197
Exports of electrical machinery, Value of domestic Oct., '19, 65, Jan., '20, 608, Feb. 742, Mar. ... 836
Exports of refrigerating machinery, Feb., 1920 ... 656

F

Factories, Losses due to removing hot air from. Alden ... *93
Fans, Motors for driving ventilating. Easton ... *759, 777
Farnsworth heating system ... *1048
Federal Coal Commission's action restrained 778
Federal service, Increased pay for technical men in ... 787
Federated American Engineering Societies (See also 229, 557, 559, 602, 946), 971, 978, Organization chart ... *979
Feed. See "Water." "Boiler."
Fernald, Robert H. ... *969
Field coils, Ampere-turns in ... 976
Files, Resharpening ... 548
Filter, New Wayne gravity oil ... *970
Filter, Simple oil, for reclaiming lubricating oil ... *391
Finney Avenue Ice Plant, St. Louis, Economy at the. Wilkie ... *990
Fire, Banking, with coarse coal ... †439
Fire hazard in transformers ... 1025
Fire, Oil, efficiency boosted by Orsat 84
Firebricks, Porosity and Volume Changes of †986
Fireman, Young, in the home ... 117
Flanges for steam-flow meters ... 892
Flashing point of fuel oil ... ‡347
Flood, Drying out a generator, switchboard and motors after a. Reed ... *250
Flow of air through small brass tubes. Taylor ... *1022
Fluids, Measuring flow of. Spitzglass *503
Flywheel accident, Peculiar. Clock ... 514
Flywheel failure is harmless ... *583
Flywheel governor bursts ... 137
Flywheel, Repaired ... *189
Flywheel Service Bureau, Steam Boiler and, accepts autogenous welding 40, Repairs made by electric welding ... *462
Food Drafts, Hoover's—A new system for sending food to individuals in Europe 524
Ford uses large refrigeration plant in making automobiles. Peterson ... *366
Ford Works, Gas-steam unit shows 72.4 per cent thermal efficiency at. Royer ... *532, 649
Ford's, Henry, new gasoline driven street car ... 327
Foreign trade convention ... 827
Forewords *1, *47, *85, 123, Criticism 438, *161, 207, *247, 285, *319, *365, *407, 449, *491, *531, *575, 615, *653, *693, *751, *791, 831, *867, *907, *949, *989 1029
Forseille liquid level gage ... *170
Founder Societies meet in Chicago, Governing boards of ... 745
"Framanco" pump regulator ... *852
Frames, Reinforced concrete for stator ... 148
France, Destruction by the Germans of coal mines in ... 193
Franklin Medal, Sir Chas. A. Parsons, K. C. B., receives ... *1021
Freeze-proof mixture in gage siphon ... 678
Freezing of brine a puzzle ... 35, 476
Frelinghuysen, Senator, proposes to settle the bituminous-coal problem ... 675
French Bros. Bauer Co.—Power and refrigeration for model ice cream and dairy plant ... *752
Fuel. See also "oil," "Kerosene," "Petroleum," "Coal."
Fuel, A new artificial? ... 816
Fuel and oil boiler efficiency ... 828
Fuel and power situation, Secretary Lane reviews ... 60, 71
Fuel, Coal or oil, for refrigerating plants? Porter ... 889
Fuel, Comparative value of coal and oil as 98
Fuel consumption and production of electric power by public utility power plants in the U. S. for Feb., Mar., Apr. and July 1919 312, For Jan., Feb. and Mar. 1920 1045
Fuel control, Temporary ... 446
Fuel economy still vital ... 1012
Fuel efficiency in power production in different states. McBride 386, B.t.u.'s vs. kw.-hrs. per ton of coal as measure of efficiency. Misostow 735, McBride ... 931
Fuel, Hog, in the Pacific Northwest .. *709, 734
Fuel-inspection system, National ... 41

Page

Fuel investigation—Robt. H. Fernald....*969
Fuel, lubricant and motor. Balancing. Parish *565
Fuel-oil bibliography.....482
Fuel oil, British control of.....763
Fuel oil, Burning.....518
Fuel oil, Economical combustion of.....*780
Fuel oil, Elements of combustion of.....333
Fuel oil, Flashing point of.....‡347
Fuel-oil profiteers, Hunting for.....147
Fuel-oil shortage.....193
Fuel-oil tank, 15,000-gal concrete.....*619
Fuel-oil tanks, Tamarack Mills.....*799
Fuel-oil, Use of, in the U. S.....460
Fuel, Oil, Use of, instead of coal in Britain 155
Fuel, Oil, vs. coal. Myers.....352
Fuel oil vs. mechanical stokers. Daniels *684, Criticism.....932
Fuel, Possibilities of alcohol as.....177
Fuel problem, The Hvid engine and its relation to the. Blakely.....*38
Fuel, Production of electric power and consumption of.....826
Fuel, Pulverized. Canadian Commission of Conservation on.....†83
Fuel, Relative value of coal and oil. Evans.*637
Fuel savings by the economizer.....*308
Fuel situation. Conservation the only way left to meet the.....853
Fuel—Year's progress in the power field.*2, 31
Furnace—Developing the chain-grate stoker. Gauss.....*144, 517
Furnace economy. Smokeless chimneys not conclusive proof of.....33
Furnace, Electric, temperature.....940
Furnace operation, Flue-gas temperature and CO_2 as a guide to. Phelps.....*725
Furnace, Smith door protectors applied to a boiler *304
Furnaces at Oneida St. Station, Pulverized fuel. Anderson *336, 339, Ed 341, *354, 681, Comparative cost 783, 855. Comparison of tests.....1013
Furnaces, Blast, bessemer, openhearth and puddle—Power drives for rolling mills. Rogers..*17, *95, *171, *291, 465, *542, *622, *800.....*962
Furnaces, Holes for inspecting thickness of corrugated .....‡191
Furnaces, Oil as a fuel for boilers and. Fleming *550
Fuse puller, Handy.....*389
Fusibility of ash from Eastern coals....*437

G

Gadsden-Huntsville extension 83
Gage cock to dampen vibrations, Choking pressure .....‡859
Gage connections, Trying glass.....‡311
Gage, Forseille liquid level.....*170
Gage, Oil and indicator.....*435
Gage spring, Bourdon, Parker.....*722
Gallagher flexible staybolt.....*430
Gallons per inch depth of vertical sided tank .....‡1017
Galvanizing process.....‡439
Garfield, Dr., Miners' wages are fair, says..471
Gas at different pressures, Equality of metering .....‡563
Gas engine. See "Engine, Internal-Combustion."
Gas flame, Color for natural.....‡821
GAS, FLUE
—Calculations from a flue-gas analysis of loss due to incomplete combustion. Brayton *129, Loss due to excess air 264, 681
—CO_2 in flue gas when burning oil.....*103
—CO_2 readings, Tables for computing combustion data from.....*966
—CO_2, Sampling tanks vs. continuous recorders for determining. Phelps....*297
—Flue-gas temperature and CO_2 as a guide to furnace operation. Phelps.....*725
Gas, Natural, consumed for power generation 569
Gas, Natural, U. S. produces about 95 per cent of the.....184
Gas Power Engineering, Elements of Steam and. Potter.....†788
Gas production by distillation of straw, corn stalks, leaves, etc.....844
Gas-steam unit shows 72.4 per cent thermal efficiency at Ford Works. Royer..*532, 649
Gas velocities, Vane for measuring stack..*233
Gas welds, Electric arc vs. 604, 934
Gaskets, Protecting lubricator.....*737
Gasoline and crude oil prices advanced in California 555, The worm commences to turn 558
Gasoline, Appropriation to investigate for a substitute for.....970
Gasoline driven street car, Henry Ford's new 327
Gasoline electric-generating sets.....106
Gasoline imported from U. S. by Great Britain, Amount of.....635
Gasoline, Properties and products of the combustion of.....165
Gasoline shortage, Danger of.....774
Gasoline substitute makes good showing..94
Gear teeth, Chart for determining proportions of. McManus. Ehlinger.....*541
Gear transmission, Turbine *921
Gebhardt, Prof. G. F.....*1008
General Electric Co.—Oil conservator *811, Portable insulating-oil testing set *849, Oxide-film lightning arrester.....*956
Generator windings, Cleaning apparatus for. Williams *878
Generators, Change in the design of rotary converters and.....137
Geological Survey, U. S., power statistics. 386, 735, 931
"Germ Process" oils.....826
Germany, Coal shortage in.....548

Page

Germany during the war, Power plant built in *252
Germany, Paper belting made in *223
Gilman, F. L.—Novel water-pumping motor.*814
Give the youngster a chance.....268
Gold mine in Ouray County, Colo.....427
Gonna! Strohm.....207
Good things coming.....32
Goodyear Rubber-Shoe Co—Peculiar flywheel accident. Clock.....514
Gosh!.....*989
Government service, Low salaries force men out of.....598
Governor driving pulley, Increasing size of.‡605
Governor, Flywheel, bursts.....137
Governor, Riva Pelton turbine.....*62
Governors, Results of belt failures with blocked .....‡605
Governors, Some characteristics of shaft. Myers *845
Governors, Steam-turbine—Small shaft governors *21, Governors of small Westinghouse turbines *135, Shaft governors of Terry turbines *254, Shaft governors of small Curtis turbines *328, Governors of 75- to 3,000- kw. Curtis turbines. Bromley *414
Governors, Use of gear drives for throttling‡395
Grate area with stokers than with hand firing, Less.....‡1059
Gravity and heating value of crude oils, Relationship between specific.....16
Gravity oil filter, New Wayne.....*970
Grease cup as wick-feed oiler, Using compression *33
Great Western Power Co.....902
Griscom-Russell storage heater.....*419
Grouch, The chronic. Strohm *47, Two-faced Tom *491
Ground detectors for d.-c. and a.-c. circuits. Gillooly *508

H

Hacksaw blade, Wire scraper made from..*679
Handhole seat, Soldering a. Kurtz.....*139
Harrington, Joseph—Combustion engineer..*813
Harrisburg dual-clearance engine *513
Hartford, Proposed $5,000,000 central station in 118
Havana central station to double power-plant capacity 1024
Hays School of Combustion Engineering—Opportunities for the Combustion Engineer .....†1026
Heads, Relative pressure for convex and concave .....‡37
Heat and Heat Engines, Examples in. Peel.†689
Heat by various surfaces, The dissipation of 985
Heat-flow diagram *113
Heat in discharge from steam-jet air pumps. Arangement for reclaiming. Taylor..*999
Heat loss from flue-gas analysis, Chart to determine per cent of. Brayton *129, Loss due to excess air 264, 681
Heat, Straightening shafts by 517
Heat, Transfer of, requires difference of temperatures .....‡521
Heater, Barometric condenser as—Extension to L Street Station, Boston. Bromley *124
Heater, Russell storage *419

HEATING AND VENTILATION

See also "Piping," "Steam," "Trap," etc.
—American Soc. Heating and Ventilating Engr.—Papers 352, *550, 610, J. R. Allen—A veteran engineering research worker *636, Paper 687, St. Louis meeting 945, Ed. 930
—Central heating systems, Abatement of corrosion in 118
—Coal consumption in institutional heating plants. Nichols *654
—Farnsworth heating system *1048
—Heating problem, Solution of a.....682
—Heating system meant well, The designer of this *857
—Heating systems, Difference in 273
—Losses due to removing hot air from factories. Alden *93
—Miller, Edw. F.—A real steam man.....*927
—National District Heating Ass'n.....985
—Super-power project one of many angles 929
—Vacuum system, Poor circulation in radiator of .....‡275
—Ventilating fans, Motors for driving. Easton *759, 777
Heating value of crude oils, Relationship between specific gravity and.....16
Hendricks' Commercial Register .....‡446
High-grade man, A 105
High wages, unsupplied demands for labor and high prices 424
Hog fuel in the Pacific Northwest..*709, 734
Hoists, Electrically driven. Jeffery.....*286
Honor roll—Year's progress in the power field *2, 31
"Hood," British battle cruiser—Designed to develop 144,000 hp. 708, 727
Hoover, Herbert, engineer *575, Wanted: A practical man *900
Hoover's Food Drafts—A new system for sending food to individuals in Europe..524
Horsepower, Conversion of B.t.u. into....‡111
Horsepower, Growth of, used in U. S., etc. Morrow *923
Horsepower, Naval, of 9,000,000 to use oil 1052
Horsepower, One pound per.....891
Hose coupling clamp *520
"Hot-Flow" softener, International *1009
Hot-process water softening *429
Human element, The 186

Page

Hvid engine and its relations to the fuel problem, The. Blakely *38
Hyatt, J. W., Death of 864
Hydraulic elevators, Care and maintenance of plunger. Burgess *101
Hydro-electric. See "Water power."
Hydrogen—A new artificial fuel?.....816
Hydrogen, Loss due to. Gauss *182

I

Ice. See "Refrigeration."
Idaho—Where electricity is a luxury.....305
If dreams came true *358
Illinois coal from vein No. 5, Burning, Marsh *1001
In charge of the engineers. Woodwell..686
Incline, Pull and power required to draw car up .....‡1017
Index, Engineering 1026
Index of equipment, Condensed-clipping.. *112, *278, *353, *564, *860
India, Mineral resources of.....827
Indiana, Electrically operated pumping plants in 276
Indicator, A new high-speed gas-engine....*720
Indicator connections, Watt-meter and power-factor. Yeaton *846
Indicator diagram—Foreword cartoon.....*365
Indicator diagram, Measuring an.....*560
Indicator diagram, Unaflow-engine.....*263
Indicator gage, Oil *435
Indicator, Wants a continuous 108
Indispensability, Strohm *653
Induction motor. See "Electricity."
Industrial and central-station plants, Interconnecting. Weber *1049, 1053
Industrial Controller Co.—Automatic compensator for starting induction motors..*335
Industrial engineer—Chas. T. Main *847
Industrial policies, England adopts American 335
Industrial power, Worcester Section A. S. M. E. discusses *113
Industrial Safety Conference 83
Industrial unrest 105, 782, 1058
Industry, Co-operation between educational institution and 267, New plan 474
Institution of Mechanical Engrs.—Local sections 827
Instrument boards, Boiler-room *228
Instruments in the steam plant 516
Insulating-oil testing set, Portable *849
Insulation, Moisture in 157
Insulation—Refrig. study course. Macintire *630
Interconnecting industrial and central-station plants, Weber *1049, 1053
International Brotherhood of Stationary Engrs.—New York engineers loyal 80
International Engineering Works, Inc.—Smith door protectors *304
International "hot-flow" softener *1009
International Union of Steam and Operating Engrs.—New York engineers loyal. 80
Inventor, Technical man as an 778
Ireland, Amount of coal available in.....165
Iron, An electric-arc soldering. Briggs...*545
Iron and Steel Elec. Engrs., Association—Papers.....80, 115, 445, 734, *861
Iron, Handy soldering. Saller *836
Italy, Steam from the earth in.....*70, *889

J

Jack for shaft alignment, Application of..*76
Japan Electric undertakings in *40
John Fritz Medal, Orville Wright presented with 823
Johnston, C. T., Death of 446
Joints, Triple riveting of lap.....‡521
Junior technical school, An advocate of the. Williston *428

K

Keeping out of the rut....268, 270, 602, 934
Kerosene as a fuel for high-speed engines. Seaton *154
Kestner evaporators—Steam from the earth in Italy *889
Kettles, Utilization of discharge from steam .....‡739
Kilowatt-hours per ton of coal as measure of efficiency, B.t.u.'s vs.....735, 931
Kinks, Pliers and screw-driver.....*519
Kinks, Three power plant *820, *1014
Knoxville, Industrial Co-operative plan.... 475
Korea, Power-plant construction in.....688
Kraemer system control—Adjustable-speed motor equipment for rolling mills. Jeffery *408

L

L Street Station, Boston, Extension to, Bromley *124
Labor shortage growing worse.....502
Labor—When strikes come *233
Lamp, Magnet-type pocket *381
Lane, Secretary, reviews fuel and power situation 60, 71, Mr. Lane's constructive work 306
Larderello—Steam from the earth *70, *889
Larkin fund to David Ranken School...1025
Lathe, Method of boring a large bearing on a small *520
Law, A needed reform in marine boiler....733
Law—Court decisions, Street.....20, 36
Law, Dalton's, applied to air-pump capacities Wheeler *296
Law, National engineers' license 234, 434, 784, 976

Page

Leaders, Training of 675
Leaks in hydraulic gates, Stopping. Wyss. 100
Leaks—Pigs in clover .....•751
Legislation, Constructive 854
Legislation, Power-plant—Year's progress in the power field •2, 31, Correction 157
Library Ass'n., American 558
License law, National engineers' 234, 434, 784, 976
Licensing steamfitters 394, 644
Lift the bushel 32
Light—Our power wastes 854
Lightning arrester, Oxide-film .....•956
Lignite and spruce wood, Steaming value of Alaska 638
Lignite, U. S. Bureau of Mines to develop the commercial treatment of 827
Lime, Precaution against burns when handling 73
Liquid level gage, Forseille .....•170
Lock Haven, Penn.—Flywheel governor bursts 137
Log sheet, Power-plant .....•344
Log sheets, Daily, applicable to all state plants. Nichols .....•655
Losses due to removing hot air from factories. Alden .....•93
Louisiana, Salt water infiltration in some oil wells in 241
Lubricant and motor, Balancing fuel. Parish .....•565
Lubricants, Specifications for 812
Lubricating an engine under varying load conditions 478
Lubricating devices neglected 932
Lubricating oil, Simple oil filter for reclaiming .....•391
Lubricating oil systems for geared turbines, Standard. Schmeltzer, Fernald 194
Lubricating oils, A new process for the preparation of 826
Lubricating oils, Crude petroleums and. Roberts 842
Lubricating oils, Gravity, flash and fire test of .....‡785
Lubricating system and rotor—Vertical-shaft waterwheel-driven alternators. Mortensen .....•837
Lubrication, Air-compressor. Osborne..... 495
Lubrication, Chicago Section A. S. M. E. discusses 200
Lubrication for turbo-alternators, Low-pressure system of. Mortensen .....•332
Lubrication, Merits of chain or ring methods of .....‡311, 559, 819; 1057
Lubrication of electric motors. Osborne... 378
Lubrication of governor of turbine.....•137
Lubrication of internal-combustion engines. Osborne 590
Lubrication of steam-engine bearings. Osborne .....•215
Lubrication of the governor. Bromley...•415
Lubrication, Practical—Oils and their physical characteristics. Osborne..... •66
Lubrication, Refrigerating-machinery..... 647
Lubrication, Steam-cylinder. Osborne..... 140
Lubrication, Steam-turbine. Osborne.....•322
Lubricator, Changing a double-connection to single-connection .....•151
Lubricator gaskets, Protecting .....•737
Lubricator plug, Emergency repair to....•435
Lumber mills, Electrical drives for. Franklin .....•536

M

McGraw Central Station Directory and Data Book .....†525
McKeesport Tin Plate Co.'s plant, Novel coal handling at the .....•178
McKenzie, Foster, of Cleveland, Ohio—An expert in economical power production.•512
Machine, Automatic arc welding.....•548
"Machine, Woman and" problem..... 232
Machinery Center, Fifteen firms unite in plant display at..... 237
Machinery, Future of marine propelling. Thomas .....•461
Machinery, Propelling, for U. S. S. "Tennessee." Sykes.....•413
MacLaurin, Dr. R. C., Death of..... 201
Magnet-type pocket lamp.....•381
Main, Chas. T.—Industrial engineer.....•847
Maintenance, Delayed..... 676
Man, A high-grade..... 105
Man, A tip for the old.....•161
Man, Every, an efficiency engineer 123, Every man not an efficiency engineer... 438
Manning, Dr. Van. H., resigns.....778, 787
Manometer for measuring high pressures, Short .....•658
Map showing approximate superpower zone •440, Ed. 431, •884
Marine boiler law, A needed reform in.... 733
Marine Engineers' Beneficial Ass'n—Annual meeting .....•240
Marine propelling machinery, Future of. Thomas .....•461
Massachusetts Boiler Inspection Department and Board of Boiler Rules, Reorganization of the 472, Has hearing in Boston.. 863
Mass. Institute of Technology—Co-operation between educational institution and industry 267, New plan..... 474
Mather & Platt, Ltd.—Multiple-stage high-pressure turbine pumping set..... 535
Measuring an indicator diagram.....•560
Measuring flow of fluids. Spitzglass.....•503
Measuring high pressures, Short manometer for .....•658
Mechanical engineering—The human element 186
Mechanical refrigeration. What is?—Refrigeration study course. Macintire •63, Ed. 32
Mechanical stokers aboard ship. Bromley.. •86

Page

Mechanical stokers, Fuel oil vs. Daniels •684, Criticism..... 932
Mechanical World Year Book for 1920....†570
Medal, Edison presented to Wm. Le Roy Emmet .....•901
Medal Orville Wright presented with John Fritz 823
Medal, Sir Chas. A. Parsons, K. C. B., receives, Franklin .....•1021
Men, Equipment vs. Beard..... •85
Merchants Ice and Coal Co.—Economy at the Finney Avenue Ice Plant, St. Louis. Wilkie .....•990
Metals, Composition and use of babbit. Jarvis .....•616
Meter rates, Standard—Basis of development. Allison 183, 186, How applied in calculating power bills •218, Demand rates .....•257
Meter read, What does the?.....•641
Meter readings—Keeping out of the rut. 268, 270, 602. 934
Meter records and their interpretation, Graphic. Hamilton .....•803
Metering problem, A freak •561, Another •1057
Metering problem, An interesting.....•390
Meters, back to zero, Turning, in New Jersey 72
Meters, Flanges for steam-flow 892
Meters, Testing polyphase watt-hour. Findley .....•875
Metric system, Agitation for adoption of the 597
Mexico, a petroleum storehouse 78, No shortage of Mexican oil 117, Fuel-oil shortage 193
Micrometer readings ..... •76
Military engineers' society is being organized 443
Mill electrical equipments, One of the world's largest steel..... 445
Mill settled, Why the.....•818
Miller, Edw. F.—A real steam man.....•927
Miller steam trap, The.....•1000
Mills Adjustable-speed motor equipment for rolling, Jeffery.....•408
Mills, Boiler-feeding system for paper....•266
Mills, Electrical drives for lumber. Franklin .....•536
Mills, Electrical drives for steel..... 115
Mills, Electrically driven steel reversing. Jeffrey .....•1030, 1054
Mills, New power plants for saw. Woods..•162
Mills, Power drives for rolling. Rogers.. •17, •95, •171, •291, •465, •542, •622, •800 •962
Mills, Steam vs. electric main-roll drives for steel.....80, •861
Mills' machinery drives, Electric motors for pulp and paper. Easton.....•584
Milwaukee Electric Railway and Light Co. —Pulverized coal under central-station boilers. Anderson •336, 339, Ed. 341, •354, 681, Comparative cost 783, 855, Comparison of tests.....1013
Mineral resources of India..... 827
Miners earn $10 to $12 per day..... 412
Miners' wages are fair, says Dr. Garfield.. 471
Mines—Secretary Lane reviews fuel and power situation.....60, 71
Moderation. Weaver 449
Mohawk Valley Engineers' Club..... 242
Moisture in insulation..... 157
Moisture, Loss due to. Gauss.....•182
Moline Station adds to steam and generating capacity. Wilson.....•208
Monel-metal blades in destroyer turbines. Rice .....•908
Monnett, Osborn—A leader in smoke abatement .....•1047
Motivation. Moss..... 831
Municipal work, Executives in, and promotion of subordinates..... 100
Myers, D. M.—A captain of coal conservation .....•549

N

Narragansett Electric Lighting Co.—Steam turbine has record run.....•809
National Asso. Stationary Engrs. 443, Knoxville industrial co-operative plan 475, National convention committee 611, New Jersey convention 986, New York State convention 1024, Iowa State convention 1062
National Board of Boiler and Pressure Vessel Inspectors 558, 569
National District Heating Ass'n..... 985
National Elec. Light Asso.—Paper 82, Operating code for large central stations 387, 856, Convention 524, 609, Another reason for an operating code 733, Reorganization plan 742, Sidelights on convention 743, Program •745, Prime Movers Committee report on steam turbines 898, New officers 902, Cooling coils for water-cooled transformers 924, Pressing problems discussed at Pasadena Convention 936, R. H. Ballard, past president •939, M. Insull, president •940, The dawn of a new day 972, Papers 1020, 1025
National Electrical Code, Revision of..649, 676
National engineers' license law..234, 434, 784 976
National Marine League 315
National Society of Engrs., A 229, The coming National Engineers' Organization 557, 559, 602, Membership increasing 946, Washington meeting 971, 978, Organization chart.....•979
Naval Architects and Marine Engrs., Society of—Paper 194
Naval horsepower of 9,000,000 to use oil.1052
Necrology—Year's progress in the power field .....•2, 31

Page

New England—Efficient utilization of water powers already developed 1011
New England, Electric service in..... 820
New Jersey legislation—Turning meters back to zero 72
"New Mexico"—Economy of electric drive 612
New Mexico, Oil and gas reservoirs in..... 632
New York engineers loyal..... 80
New York lighting companies use 3,453,408 tons of coal in a year..... 926
New York, New Haven & Hartford R.R.—Improved coal-handling facilities at Cos Cob .....•546
New York State industrial code. Proposed amendments to.....1060
Newark, N. J., Sectional elevation and plan views of oil storage and burning equipment, Burnet St. School..... •54
Newcomb, M. B., Death of..... 526
Nitrate plants, Propose to operate U. S... 688
"No Accident Week"—Be careful..... 930
Northern Equipment Co.—New Copes regulator .....•472
Nozzle tube illustrated. Spitzglass.....•504

O

Ohio Board of Boiler Rules,..... 41
Oil. See also "Lubrication."
Oil as a fuel for boilers and furnaces. Fleming .....•550
Oil as fuel, Comparative value of coal and 98
Oil at the sump, Saving.....•152
Oil—Balancing fuel, lubricant and motor. Parish .....•565
Oil boiler efficiency, Fuel and..... 828
Oil, British control of fuel..... 763
Oil burning, Capacities of steel stacks for.. 894
Oil burning—Flue-gas temperature and CO_2 as a guide to furnace operation. Phelps •725
Oil, Burning fuel..... 518
Oil, CO_2 in flue gas when burning.....•103
Oil, Comparative evaporative values of coal and 198
Oil consumed in U. S. for power..... 569
Oil, Cooling quenching—Ford uses large refrigeration plant in making automobiles. Peterson .....•366
Oil, Crude and gasoline prices advanced in California 555, The worm commences to turn 558
Oil, Economical combustion of fuel.....•780
Oil engine. See "Engine, Internal-Combustion."
Oil filter for reclaiming lubricating oil, Simple .....•391
Oil filter, New Wayne gravity .....•970
Oil fire efficiency boosted by Orsat..... 84
Oil, Flashing point of fuel.....‡347
Oil, Fuel, bibliography..... 482
Oil, Fuel, Elements of combustion of..... 333
Oil fuel for refrigerating plants, Coal or, Porter 889
Oil fuel, Relative value of coal and, Evans •637
Oil, Fuel, shortage..... 193
Oil, Fuel, tanks, Tamarack Mills.....•799
Oil fuel vs. coal. Myers..... 352
Oil, Fuel, vs. mechanical stokers. Daniels •684, Criticism..... 932
Oil in transformers, Preventing sludging of .....•811
Oil indicator gage.....•435
Oil-land leasing bill signed by President Wilson 358, 432
Oil—Mexico, a petroleum storehouse 78, No shortage of Mexican oil..... 117
Oil, Naval horsepower of 9,000,000 to use 1052
Oil pressure, Regulating the.....•434
Oil, Preventing siphonage of.....‡311
Oil profiteers, Hunting for fuel..... 147
Oil, Starting-compensator .....‡347
Oil—Steam-cylinder lubrication. Osborne.. 140
Oil storage and burning equipment, Burnet St. School, Newark, N. J., Sectional elevation and plan views of..... •54
Oil supply, Britain trying to secure a world-wide 892
Oil supply in U. S., Available..... 553
Oil supply is limited, Why our..... 472
Oil switch automatically, Alarm clock used to open .....•601
Oil systems for geared turbines, Standard lubricating. Schmeltzer, Fernald..... 194
Oil tank, 15,000-gal. concrete fuel.....•619
Oil testing methods, Better cylinder.....•389
Oil testing set, Portable insulating.....•849
Oil to run, Starting the..... 601
Oil, Use of fuel, in the U. S..... 460
Oil wells in Louisiana, Salt water infiltration in some..... 241
Oiler, Using compression grease cup as wick-feed .....•33
Oils, A new process for the preparation of lubricating 826
Oils and their physical characteristics—Practical lubrication. Osborne..... •66
Oils, Crude petroleums and lubricating. Roberts 842
Oils, Cylinder, for compound engines.....‡897
Oils, Gravity, flash and fire test of lubricating .....‡785
Oils Physical tests of. Hill.....•583
Oils, Physical tests of paraffin-base and asphaltic-base. Osborne 497
Oils, Relationship between specific gravity and heating value of crude..... 16
Old man, A tip for the.....•161
One pound per horsepower..... 891
Oneida St. Plant, Pulverized fuel at. Thompson, •336, 339, Ed. 341, •354, 681, Comparative cost 783, 855, Comparison of tests 1013
Operating code, Another reason for an.... 733
Opportunities for the Combustion Engineer .....†1026
Orient (Ill.) coal, Experimental retort test of 119

Page

Orifice plate illustrated. Spitzglass.....•504
Orsat, Oil fire efficiency boosted by 84
Overload relays—Principles of operation. Todd .....•131
Oxide-film lightning arrester.....•956

P

Pacific Coast, Power problems of the. Bromley .....•701
Pacific Coast, Power shortage on the..... 305
Pacific Gas and Electric Co.'s system, Additions to 398
Pacific Northwest, Hog fuel in the..•709, 734
Pacific Northwest, Sawmill drive in the... 733
Pacific Power and Light Co. 525
Packing rings, Alloy for metallic.....‡1059
Packing, Trouble with spray valve.....•478
Pan, Boiler water-leg drip .....•896
Paper belting made in Germany .....•223
Paper machinery drives, Electric motors for pulp and. Easton .....•584
Paper mills, Boiler-feeding system for ....•266
Parallel, How two a.c. motors were controlled in. Grant .....•1006
Parallel, Operating two similar alternators having opposite polarity in. Briggs... •810, 816
Parallel, Rotary converters in .....‡1017
Paralleling two alternators when they rotate in opposite directions. Briggs.....•886
Parallelism of engine guides, Testing .... ‡77
Paris, A super-power plant for 708
Parisian district,. Central station to supply entire 661
Parsons, Sir Chas. A., K. C. B., receives Franklin Medal .....•1021
Patches, Riveting, on cylindrical pressure shells. Hemingway, Page .....•164
Peace treaty cartoon ..... •79
Peat, Anhydrous, in Irish bogs 481
Peat bogs, Area of, of Manitoba, Ontario, Quebec and New Brunswick 916
Pelton turbine governor, Riva .....•62
Pendulum, Clock, precision speed limit...•890
Pennsylvania Electric Ass'n, discusses power factor 744, Paper 822, Harrisburg meeting 981
Per cent, Why not express vacuum values in? 109
Perpetual motion, Mr. Bissel has found another .....•818
Petroleum, British companies exploring for. 828
Petroleum production in states east of California 632
Petroleum production in the U. S. 609
Petroleum report, Gov't.—Something to think about .....•241
Petroleum storehouse, Mexico, a 78, No shortage of Mexican oil 117
Petroleum, The age of 61, 71
Petroleum, The origin of 290
Petroleum—U. S. reserves app. 40 per cent exhausted 304
Petroleum, World's production of 280
Petroleums, Crude, and lubricating oils. Roberts 842
Pigott, R. J. S.—Power-plant economist...•775
Pigs in clover .....•751
Pin from a casting, Removing a tight....•518
Pinions from Lewis' formula, Chart to determine pitch of 15-tooth cast steel. McManus, Ehlinger .....•541

PIPING

See also "Pump," "Boiler," "Condenser, Ammonia," "Valve," "Engine, Steam," "Water power," etc.

—Break, Unusual, in a 10-in. steam main.•738
—Color schemes for plant piping. Wilkinson 610
—Covering, Tests on slag wool for steampipe 280
—Coverings, Relative merits of various pipe. Morgan .....•960
—Diagram for computing thickness of plate for steel pipe. Batcheller.....•656
—Faulty heating system piping .....•436
—Feed-water piping, Diagram of—Extension to L Street Station, Boston. Bromley .....•129
—Head due to friction in water pipes, Some notes on the loss of. Brayton.... 848
—Joint, Pipe, reinforced with concrete ...•189
—Pipe-line breaks, Cause of 419
—Piping of heating system .....•1048
—Piping to paper-mill driers and boiler feeders .....•266
—Pitching and draining pressure pipe lines 638
—Power-plant piping, Design and construction of. Morgan .....384, •797
—Pump suction and discharge pipes, Velocity in .....‡479
—Size of pipe line and power for pumping .....‡977
—Sizes and velocity of flow of steam, Charts for graphical determination of pipe. Brayton .....•662, •762
—Standard pipe hanger data .....•507
—Steam pipe with superheated steam, Capacity of 231
—Steam piping in engine, compressor and boiler room, Plan of .....•754
—Underground steam main, 12-in. high pressure .....•925
—Union, An emergency .....•1056
—Water by orifice, Measuring flow of. Davis, Jordan .....•238
—Water connections, Original and new piping of .....•270
—Water motor supply pipe, Increasing size of .....‡395
—Water-supply line, Airbound .....‡683
Piston bursts—kills man 743
Piston head repaired, Fractured oil-engine.•109
Piston, Loose, caused knock .....•394
Piston-rod ends worked loose .....•35
Piston rod from crosshead, Loosening .....‡897
Pistorr would not come out, Why the.....•1014
Pitot tube illustrated. Spitzglass .....•503
Pliers and screwdriver kinks .....•519
Plug cocks, Regrinding .....‡739
Poetry .....207, •653, 686, 1029
Porosity and Volume Changes of Firebricks .....†986
Pound, One, per horsepower 891
Powdered coal. See "Pulverized."
Power activities, Geographical distribution of coal and 899
Power bills, How applied in calculating—Standard meter rates. Allison .....•218
Power costs, The year 1919 encouraging regarding 268
Power development and suggestions for future progress, A study of. Morrow..•922
Power factor. See "Electricity."
Power field, Year's progress in the •2, 31, Correction 157
Power from the tide 892

POWER PLANT

See also "Electricity," "Central station," "Boiler," "Piping," "Water power," "Lubrication," etc.

—Abbott, W. L.—A leader in power-plant operation .....•667
—Alaska, 10,000 hp. steam turbine plant, Coal Creek .....•666
—Armour South St. Paul plant, New..... •48
—Booster station, Combined gas and motor-driven pressure. Walden .....•950
—Carle, N. A.—A progressive in power-plant construction .....•728
—Chile Exploration Co.'s Tocopilla power plant. Thomas .....•492, 515
—Coal Consumption of Power Plants and Bonuses for Coal Saving. Parsons..†281
—Color schemes for plant-piping. Wilkinson 610
—Connors Creek plant—Turbine installed in record time .....•372
—Diman, Geo. H.—Power plant pioneer..•383
—Electrical and steam-plant operators... 188
—Financing improvements for the power plant. Duffey 774
—Finney Avenue Ice Plant, St. Louis, Economy at the. Wilkie .....•990
—Ford Works, Gas-steam unit shows 72.4 per cent thermal efficiency at. Royer. •532, 649
—France, Production resumed in some plants of 553
—Gebhardt, Prof. G. F.—Power-plant engineering .....•1008
—Germany during the war, Power plant built in .....•252
—Havana central station to double power-plant capacity 1024
—High wages influence power-plant design.•917
—Ice cream and dairy plant, Power and refrigeration for model .....•752
—Instruments in the steam plant 516
—Interconnecting industrial and central-station plants. Weber .....•1049, 1053
—International power plant on Uruguay River 825
—Kinks, Three power plant .....•820, •1014
—Knoxville industrial co-operative plan... 475
—Korea, Power-plant construction in..... 688
—L Street Station, Boston, Extension to. Bromley .....•124
—Leaks—"Pigs in clover".....•751
—Leaks that waste coal, Three power-plant. Smith 627, 976
—Log sheet, Power-plant .....•344
—McKeesport Tin Plate Co.'s plant, Novel coal handling at the .....•178
—Machinery Center, Fifteen firms unite in plant display at 237
—Maintenance, Delayed 676
—Mill settled, Why the .....•818
—Mills, Adjustable-speed motor equipment for rolling. Jeffery .....•408
—Mills, Electrical drives for lumber. Franklin .....•536
—Mills, Electrical drives for steel 115
—Mills, Electrically driven steel reversing. Jeffrey .....•1030, 1054
—Mills, Power drives for rolling. Rogers. •17, •95, •171, •291, •465, •542, •622, •800, •962
—Mills, Steam vs. electric main-roll drives for steel .....80, •861
—Mills' machinery drives, Electric motors for pulp and paper. Easton .....•584
—Moline Station adds to steam and generating capacity. Wilson .....•208
—Mount Union plant, Penn., War Dept. offers for sale 98
—New York, Latest, power plant to have large units 864
—Nitrate plants, Propose to operate U. S. 688
—Okanogan Valley, Wash., steam pumping plant 443
—Oneida St. Station, Pulverized-fuel plant at •354, •336, 339, Ed. 341, 681, Comparative cost 783, 855, Comparison of tests 1013
—Organized power-plant employees 1016
—Paper mills, Boiler-feeding system for..•266
—Paris, A super-power plant for 708
—Paying basis, On a 267
—Pigott, R. J. S.—Power-plant economist.•775
—Piping, Design and construction of power-plant. Morgan.....384, •797
—Production of electric power and fuel consumption by public utility power plants in the U. S. for Feb., Mar., Apr., and July, 1919 312, For Jan., Feb. and Mar., 1920 1045

Page

POWER PLANT—Continued
—Railroad stationary plants, Operation and maintenance of 313
—Railway stationary plants, Design of... 192
—Sawmills, New power plants for. Woods .....•162
—Sinclair, New, boiler plant at East Chicago .....•576
—Sparrows Point, Md.—One of the world's largest steel-mill electrical equipments. 445
—Steam electric power-plant layouts. Dennis 104
—Super-power central station, Proposed (supplement), Stevens •832, 853, Economies to be expected .....•879
—Super-power project one of many angles. 929
—Tamarack Mills, Fuel oil tanks.....•799
—Treatment of power-plant trouble. Sailer .....•58
—West Penn Power Co.—Vertical shaft being driven to a 7-ft. vein of coal..... 184
—Year's progress in the power field....•2, 31
Power problems of the Pacific Coast. Bromley .....•701
Power production, An expert in economical —Foster McKenzie, of Cleveland, Ohio..•512
Power requirements in North Atlantic Seaboard States—Constructive legislation... 854
Power shortage on the Pacific Coast..... 305
Power situation, Secretary Lane reviews fuel and 60, 71
Power supply and generation of the future. 60, 71
Power wastes, Our 854
Power, Worcester Section A. S. M. E. discusses industrial .....•113
Precaution against burns when handling lime 73
Precision speed limit, Clock-pendulum.....•890
Pressinger, W. P., Death of 1062
Pressure charts, Averaging.....273, 307
Pressure, Forward, back pressure, and m.e.p. .....‡347
Pressure gage cock to dampen vibrations, Choking .....‡859
Pressure in closed heater higher than boiler pressure .....‡859
Pressure in thick hollow cylinders, Allowable .....•104
Pressure on a bit brace, Getting .....•642
Pressure, Regulating the oil .....•434
Pressure regulator, R. K. hydro-electric..•888
Pressure shells, Riveting patches on cylindrical. Hemingway, Page .....•164
Pressure-temperature scales for low-pressure steam .....•817
Pressure values given in steam tables .....‡935
Pressure Vessel Inspectors, National Board of Boiler and 558, 569
Pressures and temperatures, Regulation of—Practical refrigeration for the operating engineer. Hill .....•581
Pressures, Short manometer for measuring high .....•658
Presto! Change-O! Strohm.....•867
Profiteers, Hunting for fuel-oil 147
Propelling machinery for U. S. S. "Tennessee." Sykes .....•413
Propelling machinery, Future of marine. Thomas .....•461
Protectors, Smith door .....•304
Public ownership—The dawn of a new day 972
Public Service Electric Co.—1919 output greater than 1918 743
Public utility companies' side of the coal situation 399
Publicity for engineering societies 516
Puget Sound Traction, Light and Power Co.—Fatal boiler explosion at Seattle •444, Washery sludge burned in pulverized form at Seattle 729
Pull and power required to draw car up incline .....‡1017
Pulley, Compressed-spruce .....•885
Pulley, Increasing size of governor driving .....‡605
Pulleys, Belt thickness influences speed ratio of .....‡521
Pulp and paper machinery drives, Electric motors for. Easton .....•584
Pulverized coal applied to copper blast furnaces 329
Pulverized coal under central-station boilers, Anderson •336, 339, Ed. 341, •354, 681, Comparative cost 783, 855, Comparison of tests 1013
Pulverized form at Seattle, Washery sludge burned in 729
Pulverized Fuel, Canadian Commission of Conservation on ..... †83

PUMP

See also "Piping," "Valve," "Coupling," etc.

—Air chambers, Form of pump .....‡739
—Airbound, Cause of pump becoming ...‡935
—Air-pump capacities, Dalton's law applied to. Wheeler .....•296
—Air pumps for condensing equipment. Wheeler 195
—Automatic control for motors driving pumps and compressors. Jones .....•498
—Centrifugal pump, Small synchronous motor driving. Brown .....•25
—Centrifugal pumps, Parallel discharge of. Heermans .....•554
—Centrifugal pumps, Synchronous motors for driving. Mortensen .....•90, •603
—Combined gas and motor-driven pressure booster station. Walden.....•950
—Controller, Emergency automatic. Briggs. •143
—Cylinders, Relative length of pump...‡1017
—Discharge of attached circulating pump..‡645
—Drain trenches in pump and condenser pits 310
—Duplex fire pump, Over-stroking of ...‡395

Page

PUMP—Continued
—Duplex pump, Compression regulating valves of ‡191
—Duplex pump, Lame running of ‡235
—Duplex pump, Lead for direct ‡37
—Duplex pump, Resetting spool on ‡785
—Economy of direct steam pumps ‡821
—Electrically operated pumping plants in Indiana 276
—Exports, Domestic, of pumps and pumping machinery, to Oct., 1919 197
—Feed pump, Determining size of ‡275
—Feed pump, Jumping of ‡785
—Flywheel pumps, Advantages of modern over old-style ‡111
—"Framanco" pump regulator *852
—Lift of jet pump ‡859
—Multiple-stage high-pressure turbine pumping set 535
—Pipe line, Size of, and power for pumping ‡977
—Pumping water with a spiral-spring belt. 874
—Regulating pump with variable steam pressure ‡395
—Repairing cracked pump casing *109
—Revolutions of pump ‡935
—Setting steam valves of duplex pump ‡1059
—Sinking pump, Pressure at discharge coupling of ‡935
—Steam-jet air pumps for condensers. Taylor *995
—Suction pipe, Trouble from long pump. ‡77
—Suction valves, Size of pump ‡785
—Valves, Compression, on steam end of pump ‡37
—Water-pumping motor, Novel *814
—Welding, Repairs made by electric *462

R

R. K. hydro-electric pressure regulator *888
Radio Telegraphy and Telephony, Robison's Manual of †84
Railroad stationary plants, Operation and maintenance of 313
Railroads Electrification of the—Secretary Lane's recommendations 60, 71
Railway stationary plants, Design of 192
Randolf, J. A., Death of 446
Ratchet wrench, Adjustable *776
Rateau Battu Smoot Co.—High-speed turbine-driven blowers *450
Rates of heating companies in various cities of the U. S. 65
Rates, Standard meter—Basis of development. Allison 183, 186, How applied in calculating power bills *218, Demand rates *257
Ratio of expansion ‡897
Reactive factor ‡275
Reboring Corliss valve chambers 274, 559, 779
Reconnecting induction motors—Reconnecting problems. Dudley *55
Recorders for determining CO_2, Sampling tanks vs. continuous. Phelps *297
Records and their interpretation, Graphic meter. Hamilton *803
Records—Efficient operation of the boiler plant. Morgan *868, *957
Records, Electrical maintenance 147

REFRIGERATION
—Absorption machine merely needed better steam circulation. Parsons 69
—American Soc. Refrig. Engrs.—St. Louis meeting 943, Ed. 930
—Ammonia and air compressor, A perfected high-pressure rotary. Lord *156
—Ammonia charge goes, Where the. Porter 618, 896
—Ammonia coil for cooling water ‡37
—Ammonia compressor, Engine-type synchronous motor driving. Brown *26
—Ammonia-compressor explosions. Hill 382, 388
—Ammonia compressor, Large, driven by a compound uniflow-Corliss engine. Hill *955
—Ammonia compressor, Setting piston clearance of ‡235
—Ammonia compressors with turbines and air compressors in background *49
—Ammonia condenser, Cleaning the double-pipe. Solomon *169
—Ammonia from coils, Precautions when pumping. Hill *718
—Ammonia in circulation in compression refrigeration, Two indirect methods of finding the weight of. Gavett *1042
—Ammonia leaks in refrigerating plants, Testing for. Hill *955
—Armour South St. Paul plant, New *48
—Brine, Freezing of, a puzzle 35, 476
—Coal or oil fuel for refrigerating plants? Porter 889
—Experiences, Some refrigerating plant. Tullis 30
—Exports, during Oct. 1919, of air-compressing and refrigerating machinery 197
—Exports of refrigerating machinery, Feb. 1920 656
—Exports of refrigerating machinery to various countries 472
—Finney Avenue Ice Plant, St. Louis. Economy at the. Wilkie *990
—Ford uses large refrigeration plant in making automobiles, Peterson *366
—Future of refrigeration, The 72
—Ice cream and dairy plant, Power and refrigeration for model *752
—Ice plant in Cuba, Model small. Kilian *248
—Ice, Refrigerating effect of natural and artificial 152, Ryan 731
—International Conference of Refrigeration 315
—Lubrication, Refrigerating-machinery 647
—Natural refrigeration, Used 1056
—Need of competent engineers 561, 737

Page

REFRIGERATION—Continued
—Needed feature of the refrigerating industry 815
—Practical refrigeration for the operating engineer—Getting acquainted with the plant. Hill *320, Correction 604, Regulation of pressures and temperatures *581, Pure water as feed water 784
—Refrigeration for the practical engineer. Hill 382, 388
—Study course, Refrigeration—I, What is mechanical refrigeration? Macintire *63, Ed. 32, II, Ammonia-compression system *138, The ammonia compressor *220, The ammonia condenser *301, Ammonia fittings and accessories *459, The brine system *540, Insulation *630, Low-temperature ammonia compression *669, The high-speed ammonia compressor *769, Automatic refrigeration *840, Refrigerants *914, Cooling water *1001
—Tank won't work, Believes purge 73
—Troubleman, On the road with the refrigerating. Moran 420, 509, 807, *873
—Year's progress in the power field *2, 31
Register, Hendricks' Commercial †446
Regrinding of stop-cock, Too much *682
Regrinding plug cocks ‡739
Regulator, New Copes *472
Relays installed on emergency service, Reverse-current *36
Relays, Overload—Principles of operation. Todd *131
Relays, Protective and service restoring, Todd *912
Removing a tight pin from a casting *518
Repair, Emergency, to lubricator plug *435
Repair jobs in Central America *189
Repaired, Fractured oil-engine piston head. *109
Repairing a boiler-plate lamination *519, 817
Repairing a commutator under difficulties *108
Repairing a shell-type transformer, Reed. *723
Repairing cracked pump casing *109
Repairing cracked tube sheets *190
Repairs made by electric welding *462
Report sheet that dispensed with four report sheets *344
Report sheet, Weekly boiler-room, Morgan *960
Republican Club—Repairs made by electric welding *462
Research worker, A veteran engineering—J. R. Allen *636
Resharpening files 548
Reverse-current relays installed on emergency service *36
Rheostat connected to rotor slip rings, Water *188
Ring shaft lubrication, Merits of chain and 559, 819, 1057
Rings, Alloy for metallic packing ‡1059
Riva Pelton turbine governor *62
Riveting patches on cylindrical pressure shells, Hemingway, Page *164
Rockport, Texas, Boiler explosion at *27, Why boilers explode 31, Possible causes of boiler explosions 644
Rub-a-dub, two men in a tub *79
Rules for autogenous welding 471
Rules for the safe operation of steam engines and turbines, Clock 732
Rules, Simple belt-lacing, Black 761
Russell storage heater *419
Rut, Keeping out of the 268, 270, 602, 934

S

Safe operation of steam engines and turbines, Rules for the, Clock 732
Safety codes—"Better safe than sorry" 306
Safety first for the engine room, Ray 686
Safety, Industrial, Conference 83
Safety motor-starting switch *65
St. Louis Economy at the Finney Avenue Ice Plant, Wilkie *990
St. Paul & Tacoma Lumber Co.—Hog fuel in the Pacific Northwest *709, 734
St. Paul plant, New Armour South *48
Salaries, Low, force men out of Government service 598
Salt Lake's smoke problem, Snow employed in 217, Sampling atmosphere by airplane *279
Salts, Bichromate, as boiler compound, Use of 477
Sawdust—Willful waste makes woeful want 280
Sawmill drive in the Pacific Northwest 733
Saw mills, New power plants for, Woods *162
Scale formed in safety valve *270
Scale, Not coal, but *394
Scales for low-pressure steam, Pressure-temperature *817
Schmid, A., Death of 201
School, An advocate of the junior technical, Williston *428
School, Larkin fund to David Ranken 1025
School, Newark, N. J., Sectional elevation and plan views of oil storage and burning equipment, Burnet St. *54
Scraper, Wire, made from hacksaw blade *679
Screens, Traveling, reduced labor *1055
Screwdriver, Pliers and, kinks *519
Seattle, Fatal boiler explosion at *444
Seattle, Washery sludge burned in pulverized form at 729
Selling Your Services, Pearson †570
Semi-Diesel engines, Light-load running device for 118
Shaft governors, Small—Steam-turbine governors *21
Shaft lubrication 1057
Shaft, Vertical, being driven to a 7-ft. vein of coal—West Penn Power Co. 184
Shafting sizes, Recommends standard 814
Shafts by heat, Straightening 517
Shafts, Lining turbine and generator, Patterson *370
Shaw monolith suspended boiler arch *458

Page

Sheet, Power-plant log *344
Shells Riveting patches on cylindrical pressure, Hemingway, Page *164
Ship in the world, "Africa" largest Diesel-engine driven 970
Ship, Mechanical stokers aboard, Bromley *86
Ships, Emergency Fleet Corp. water-tube boilers for wood, Dean, Kreisinger *348, Ed. 516
Shoveler—Which, Right- or left-hand? *310
Shrink fits, Allowances for ‡563
Sierra & San Francisco Power Co. 279
Signal system for use in place of telephone *74
Signaling board in boiler room *262
Silt disposal at Tacoma hydro-electric plant, Evans *694
Sinclair, New, boiler plant at East Chicago *576
Siphon, Automatic control for *309
Siphon, Freeze-proof mixture in gage 678
Slag wool for steam-pipe covering, Tests on 280
Sludge, Washery, burned in pulverized form at Seattle 729
Smiles, Cheney *1
Smith door protectors *304
Smoke abatement, A leader in—Osborn Monnett *1047
Smoke abatement—Year's progress in the power field *2, 31
Smoke connection to stack Provision for ‡821
Smoke nuisance, Eliminating the 779
Smoke problem, Snow employed in Salt Lake's 217, Sampling atmosphere by airplane *279
Smoke-stack of locomotive-type boiler, Flame in ‡153
Smoke—Swat the waster *41
Smokeless chimneys not conclusive proof of furnace economy 33
Social function of the engineer 117
Society of Amer. Military Engrs 443
Soda for boiler-plate cracks, Why blame caustic? 677
"Soffioni"—Steam from the earth *70, *889
Softener, International "Hot-Flow" *1009
Soldering a handhole seat, Kurtz *139
Soldering caused trouble on d.-c. armature, Faulty *107
Soldering iron, An electric-arc, Briggs *545
Soldering iron, Handy, Saller *836
Soot on boiler tubes, Effect of, Morgan *872, *957
South St. Paul plant, New Armour *48
Specialists, Shortage of engineering 115
Specific gravity and heating value of crude oils, Relationship between 16
Specific gravity, Conversion of Baumé degrees to ‡1059
Specifications for lubricants 812
Speed, Adjustable, motor equipment for rolling mills, Jeffery *408
Speed limit, Clock-pendulum precision *890
Spring, Bourdon gage, Parker *722
Spruce, Compressed, pulley *885
Stack, Provision for smoke connection to ‡821
Stack velocities, Measuring small *233
Stacks, Capacities of steel, for oil burning 894
Starrs, Geo. R., Death of *399
Stator frames, Reinforced concrete for 148
Staybolt, Gallagher flexible *430
Staybolt holes, Electrically welded *151
Steam, See also "Cylinder," "Power plant," "Engine," "Condenser," "Turbine," "Pump," "Boiler," "Gage," "Valve," "Heating and ventilation," "Piping," "Trap."
Steam, Additional, for increased back pressure ‡347, 783
Steam alignment diagram, A *1045
Steam and Gas Power Engineering, Elements of. Potter †788
Steam and generating capacity, Moline Station adds to. Wilson *208
Steam, Charts for graphical determination of pipe sizes and velocity of flow of. Brayton *662, *762
Steam circulation, Absorption machine merely needed better. Parsons 69
Steam consumptions of hydraulic pumps and steam-jet ejectors, Comparison of. Taylor *999
Steam—Dispatching method of operating boiler plant *262
Steam, Exhaust—New Armour South St. Paul plant *48
Steam-flow meters, Flanges for 892
Steam from a cubic foot of water ‡563
Steam from the earth *70, *889
Steam kettles, Utilization of discharge from ‡739
Steam line, Willans total, Flory *740
Steam, Live, wasted through back-pressure valve ‡439
Steam man, A real—Edw. F. Miller *927
Steam, Pressure-temperature scales for low-pressure *817
Steam, Reporting average cost per pound of ‡311
Steam requirements of a typical industrial plant under different conditions. Weber *1050, 1053
Steam, Superheated, Capacity of steam pipe with 231
Steam, Superheated—Why not? 33
Steam, Superheating wet 688
Steam, Supersaturated 999, 1012
Steam tables, Pressure values given in ‡935
Steam trap, The Miller *1000
Steam vs. electric main-roll drives for steel mills 80, *861
Steam with separating calorimeter, Testing quality of ‡235
Steamboat Inspection Service amends its rules *80
Steamfitters, Licensing 394, 644
Steamship engine construction, Ball bearings in 352
Steel foundation for temporary 10,000-kw. turbine *373

Page

Steel in Tension, Compression and Shear. Relation Between the Elastic Strengths of. Seely, Putnam ....†788
Steel-mill electrical equipments, One of the world's largest.... 445
Steel mills, Adjustable-speed motor equipment for. Jeffery....*408
Steel mills, Electrical drives for.... 115
Steel mills, Power drives for. Rogers.... *17, *95, *171, *291, *465, *542, *622, *800, *962
Steel mills, Steam vs. electric main-roll drives for....80, *861
Steel reversing mills, Electrically driven. Jeffrey....*1030, 1054
Steel stacks for oil burning, Capacities of. 894
Stick, The big. Strohm....*1029
Stoker definitions, Boiler and....982, Ed. 971
Stoker, Developing the chain-grate. Gauss *144, 517
Stoker lineshaft Changed....*781
Stokers aboard ship, Mechanical. Bromley *86
Stokers—Efficient operation of the boiler plant. Morgan....*957
Stokers, Fuel oil vs. mechanical. Daniels *684, Criticism.... 932
Stokers—Power drives for rolling mills. Rogers..*291, *465, *542, *622, *800, *962
Stokers than with hand firing, Less grate area with....‡1059
Stokers—Year's progress in the power field....*2, 31
Stoking with different rates of firing, Comparative efficiency of underfeed, overfeed and hand....*113
Storage heater, Russell....*419
Strainer, A good water-line....*560
Strengths of Steel in Tension, Compression and Shear, Relation between the Elastic. Seely, Putnam....†788
Strikes come, When....*233
Study course for the coal trade.... 687
Study course, Refrigeration 1, What is mechanical refrigeration? Macintire *63, Ed. 32, Ammonia-compression system *138, The ammonia compressor *220, The ammonia condenser *301, Ammonia fittings and accessories *459, The brine system *540, Insulation *630, Low-temperature ammonia compression *669, The high-speed ammonia compressor *769, Automatic refrigeration *840, Refrigerants *914, Cooling water....*1004
Sturtevant turbine governors *22, Turbine-gear transmission....*921
Success, Qualities of. Brown.... 674
Sulphur Occurs in Coal, A study of the Forms in Which. Powell, Parr.... †84
Sump—Automatic control for siphon....*309
Sump, Saving oil at the....*152
Sundry Civil Bill.... 939
Superheating wet steam.... 688
Superheating with reciprocating engines... 895
Super-power central station, Proposed (Supplement). Stevens *832, 853, Economies expected....*879
Super-power item—Sundry Civil Bill 939, Power survey authorized....1062
Super-power project one of many angles.. 929
Supersaturated steam....999, 1012
Swat the waster....*41
Switch automatically, Alarm clock used to open oil....*601
Switch, Safety motor-starting....*65
Switches, Installing disconnecting....*150
Synchronous-motor applications, Berkshire.*166
Synchronous motor, Unity power-factor. Berkshire....*850, 854
Synchronous motor is caused to pull out, What happens when a?....274, *893
Synchronous motor, Size of....‡935
Synchronous-motor trouble.... 75
Synchronous motors—Cost of low power factor. Brown....*24
Synchronous motors for driving centrifugal pumps, Mortensen....*90, *603
Synchronous motors for industrial applications, Induction and. Drake.... 822

T

Table—Average temperature of colder manufacturing areas from Oct. 1 to May 1. Alden....*94
Table—Cylinder temperatures at the end of the piston stroke. Osborne.... 497
Table—Direct radiation required per 1,000 cu.ft. of air per min. Alden....*94
Table—Gallons condenser water per ton refrigeration—Refrig. study course. Macintire....*303
Table—Relative value of coal and oil. Fleming....*551
Table—Sizes and types of motors and methods of drive for lumber-mill applications. Franklin....*539
Table, Unit boiler-plant rating. Lee....*377
Tables—Flow of water, saturated steam, gas and air. Spitzglass....*504
Tables for computing combustion data from CO_2 readings....*966
Tables—Physical tests of paraffin-base and asphaltic-base oils. Osborne.... 497
Tacoma hydro-electric plant, Silt disposal at. Evans....*694
Tamarack Mills, Fuel-oil tanks....*799
Tank, 15,000-gal. concrete fuel-oil....*619
Tank, Gallons per inch depth of vertical sided....‡1017
Tank won't work, Believes purge.... 73
Tanks, Capacity of cylindrical....‡153
Tanks, Live-steam coils for oil-storage..‡897
Tanks, Sampling, vs. continuous recorders for determining CO_2. Phelps....*297
Tanks, Tamarack Mills, Fuel-oil....*799
Taunton-New Bedford Copper Co.—Old engine dismantled, installed 69 years ago....1001

Page

Taylor Society, Carl G. Barth honored by the.... 900
Technical Advisory Committee to continue work....1023
Technical man as an inventor.... 778
Technical men in Federal service Increased pay for.... 787
Technical school, An advocate of the junior. Williston....*428
"Technology Plan"—Co-operation between educational institution and industry 267, New plan.... 474
Teeth, Chart for determining proportions of gear. McManus, Ehlinger....*541
Telegraphy and Telephony, Robison's Manual of Radio....‡84
Telephone, Signal system for use in place of....*74
Telephony, Robison's Manual of Radio Telegraphy and....‡84
Temperature distillation of coal, Regional power development and the low.... 824, Ed. 815
Temperature, Low, ammonia compression—Refrig. study course. Macintire....*669
Temperature of feed water from heater. Morgan....*958
Temperatures, Regulation of pressures and—Practical refrigeration for the operating engineer. Hill....*581
Templet for cutting commutator mica segments. Harris....*635
"Tennessee," Propelling machinery for U. S. S. Sykes....*413
Terry turbines, Shaft governors of....*254
Test, Boiler, at East Chicago Sinclair plant.*580
Test data from specific plants.... 277
Test, Diagram of a Cleveland open cup. Osborne....*67
Test, Feed-water heater. Morgan....*957
Test Four-day, on five Oneida St. boilers burning pulverized coal *354, *336, 339, Ed. 341, Comparative cost 783, 855, Comparison of tests....1013
Test—Gas-steam unit shows 72.4 per cent thermal efficiency at Ford Works. Royer *532, 649
Test of Orient (Ill.) coal Experimental retort.... 119
Test of Stirling boilers using wood fuel... *711, 734
Test on two 94-hp. r.-t. boilers. Morgan. *870, *957
Test, Sample record from an indicating wattmeter used during a. Hamilton..*804
Testing engines for 40,000 ft. in the air. McBride....*792
Testing for ammonia leaks in refrigerating plants. Hill....*955
Testing methods, Better cylinder-oil....*389
Testing on a grounded circuit. Parham..*593
Testing parallelism of engine guides.... ‡77
Testing polyphase watt-hour meters. Findley....*875
Testing set, Portable insulating-oil....*849
Testing synchronous motor driving two single-stage pumps. Mortensen...*90, *603
Testing, Weld, device....*346
Tests—Balancing fuel, lubricant and motor. Parish....*565
Tests—Emergency Fleet Corp. water-tube boilers for wood ships. Dean, Kreisinger....*348, Ed. 516
Tests, How to make—Locating faults in induction motors. Dudley....*453
Tests—Kerosene as a fuel for high-speed engines. Seaton....*154
Tests on 520-hp. boiler equipped with chain-grate stoker. Results of. Marsh.*1001
Tests on slag wool for steam-pipe covering 280
Tests—The dissipation of heat by various surfaces.... 985
Thermal efficiency at Ford Works, Gas-steam unit shows 72.4 per cent. Royer..*532, 649
Thinking, Do your own! Carpenter.... 615
Tidal ebb and flow in Great Britain, Utilization of 708, Power from the tide.. 892
Tip, A, for the old man....*161
Tocopilla power plant, Chile Exploration Co.'s. Thomas....*492, 515
Toledo Railway and Light Co.—Wreck of motor-generator set....*485
Tom, Two-faced. Strohm....*491
Tool for pulling worn hydraulic valve seats....*642
Tools for removing coils....*346
Torch, Non-upsetting....*232
Trade, Proposed cut in appropriations for promoting foreign.... 432
Training of leaders.... 675
Transformer connections, Three-phase power from single-phase. Gibbs.....*672
Transformer-loss eliminator, A.....*973
Transformer, Repairing a shell-type. Reed.*723
Transformer—Year's progress in the power field....*2, 31
Transformers, Cooling coils for water-cooled.... 924
Transformers, Fire hazard in.....1025
Transformers, Large.... 945
Transformers operate, How three-phase. Gibbs....*1002
Transformers, Preventing sludging of oil in....*811
Transmission, Turbine-gear....*921
Trap connections, Return....‡37
Trap expansion movement, Increasing...*600
Trap, The Miller steam....*1000
Trap was made, How the oil....*152
Traveling screens reduced labor.....*1055
Trouble man, On the road with the refrigerating. Moran.....420, 509, 807, *873
Tube, Boiler. See "Boiler."
Tube, Condenser. See "Condenser, steam."
Tubes Flow of air through small brass. Taylor....*1022

Page

TURBINE, STEAM.
See also "Pump," "Electricity," "Blower," etc.
—Balancing steam turbines....*532
—Blades, Monel-metal, in destroyer turbines. Rice....*908
—Design, Engineers who use turbines should have a voice in their.... 557
—Explosion at Phoenix Mills, Utica, N.Y. 936
—Foundations, Proper lining upon, for operation of geared marine turbines.1052
—Gear transmission, Turbine....*921
—Geared turbines, Standard lubricating oil systems for. Schmeltzer, Fernald... 104
—Gears, High-speed turbine.... 116
—Governors, Steam-turbine—Small shaft governors *21, Governors of small Westinghouse turbines *135, Shaft governors of Terry turbines *254, Shaft governors of small Curtis turbines *328, Governors of 75- to 3,000-kw. Curtis turbines. Bromley....*414
—High-speed turbine-driven blowers. Smoot....*450
—Lubrication, Steam-turbine. Osborne..*322
—Mixed pressure extraction turbines....*48
—Operating troubles with steam turbines. 436
—Parsons, Sir Chas. A., K. C. B., receives Franklin Medal....*1021
—Rules for the safe operation of steam engines and turbines. Clock.... 732
—Shafts, Lining turbine and generator. Patterson....*370
—Steam from the earth in Italy.....*889
—Steam-turbine economy characteristics. Flory....*740
—Steam turbine has record run *809, Another long run....1056
—Steam turbine, The. Sniffen.... 82
—Steam turbines, Prime Movers Committee report on.... 898
—Superheated steam in turbines.... 787
—Supersaturated steam.....999, 1012
—Turbine a one-speed machine.....‡521
—Turbine-driven vs. engine-driven alternators—I Mortensen *330, II *425, III *469
—Turbine installed in record time....*372
—Waterbury turbine explosion Details of the....*633
—Year's progress in the power field....*2, 31
Turbine, Water. See "Water Power."
Turbo-air compressors, Advantages of..‡739
Turbo-alternator—Year's progress in the power field....*2, 31
Turbo-alternators, Cooling of.... 473
Turbo-blowers—Power drives for rolling mills. Rogers.... *465, *542, *622, *800, *962
Turbo-generators—Propelling machinery for U. S. S. "Tennessee." Sykes.....*413
Turbo-generators—Regulating the oil pressure....*434
Tuscany—Steam from the earth....*70, *889
Two-faced Tom. Strohm....*491

U

Uniflow engine, The....*263
Union, An emergency....*1056
Union Traction Co. of Indiana—Unusual break in a 10-in. steam main.....*738
United Electric Light & Power Co.—Latest New York power plant to have large units.... 864
U. S. produces about 95 per cent of the natural gas.... 184
Unorganized labor—When strikes come...*233
Unrest, Industrial.....105, 782, 1058

V

Vacuum gage reading referred to barometer....‡395
Vacuum referred to standard 30 barometer....‡977
Vacuum to pounds per sq.in., Conversion of inches of....‡439
Vacuum values in per cent. Why not express?.... 109

VALVE
See also "Engine, Steam," "Pump," "Boiler," "Engine, Internal-combustion," etc.
—Automatic expansion and control valves—Refrig. study course. Macintire...*840
—Blind of a valve....‡683
—Car-operating valve, Burgess.....*102
—Curtis turbine governor valve. Bromley.*416
—D slide valve—Necessity of unequal laps for equalizing cutoff....‡859
—D slide valve, Steam laps of....‡935
—Engine valves, Types of—Power drives for rolling mills. Rogers....*800, 962
—Feather and plate valves in section, etc. Refrig. study course. Macintire....*770
—Globe valve, Direction of setting....‡275
—Governor and automatic throttle valves.*136
—Governor valve, Case of a stuck.....1055
—Governor valve small Curtis turbine..*329
—Home-made emergency valve. Noble.*214
—Hydraulic valve seats, Tool for pulling worn....*642
—L Street Station, Dean electrically controlled valves in. Bromley.....*126
—Lap and negative lead of valve.....‡739
—Lap on head end of valve, Reason for greater....‡77
—Link valve gear, Proportions of.....‡683
—Multi-pump valves, Advantages of....‡977
—Noisy exhaust valves.....‡1017
—Packing, Trouble with spray-valve....*478
—Packing valve stems under pressure 476, Not good for all valves.... 896

Page

VALVE—Continued
—Pilot valve, Principle of modern; View of bypass valve—Pop's water-power course. Carpenter .....•260
—Pilot valve, Rudimental idea of—Pop's water-power course. Carpenter .....•100
—Pipe-line valves, Care of 272
—Pressure-reducing and pressure-regulating valves .....‡785
—Radial valve gear .....‡785
—Reboring Corliss valve chambers 274, 559, 779
—Reseating an angle valve .....•151
—Safety valve, Blowdown of .....‡645
—Safety valve, Frozen, causes boiler explosion 157, •175, 186, Discussion (whole page) 433, 434, Hazards of the human element 639, Possible causes of boiler explosions 644, Freeze-proof mixture in gage siphon.. 678
—Safety valve lever, Weight required at end of .....‡479
—Safety valve—Pressure in closed heater higher than boiler pressure .....‡859
—Safety-valve seats, Leaky 343
—Scale formed in safety valve .....•270
—Stop-cock Too much regrinding of...•682
—Suction and discharge valve—Refrig. study course. Macintire .....•221
—Terry governor valve, Standard type of.•255
—Trick's slide valve .....•‡821
—Valve failure and valve steels in internal-combustion engines. Aitchison 396
—Valve-seat repair .....•189
—Valve-timing mechanism, Adjustment of. Snow .....•968
—Water lift when the safety valve blows, Why does the? ...232, 269, 307, 343, 642
Vane for measuring stack gas velocities.•233
Venturi tube illustrated. Spitzglass ....•504
Vessels in New England coal trade operated at a loss 252
Vickers-Petters light-load running device for semi-Diesel engines 118, 458
Viscosimeter, Sectional diagram of the Universal Saybolt. Osborne ..... •68
Volatile matter in coal, Determination of. 149
Voltages with various connections and phases, Comparison of motor. Dudley •55
Volterra—Steam from the earth.....•70, •889
Volume Changes of Firebricks, Porosity and .....‡986

W

Wage increase in the water, light and power industries 102
Wages, High, influence power-plant design .....•917
Walsh, Major E. T., Death of 201
Wanted: A practical man .....•900
Washery sludge burned in pulverized form at Seattle 729
Washington State Coal Commission holds preliminary meeting 743
Waster, Swat the ..... •41
Watch, Demagnetizing a 308
Water, A drop of. Pagett .....•693
Water, Ammonia coil for cooling ..... ‡37
Water by movable bent tube, Raising ....‡111
Water by orifice, Measuring flow of. Davis, Jordan .....•238
Water, Cooling—Refrig. study course. Macintire .....•1004
Water delivery—Combined gas and motor-driven pressure booster station. Walden.•950
Water, Drinking, Cooling—Ford uses large refrigeration plant in making automobiles. Peterson .....•366
Water, Electrical conductivity of .....‡645
Water—Equivalent evaporation. Johnson..•28
Waterfall, Prehistoric, near Thorold, Ont. 427
Water heater, Corrosion of feed .....‡191
Water heater, Saving from use of feed.‡1059
Water heater test, Feed. Morgan .....•957
Water-line strainer, A good .....•560

WATER POWER

—Bhakra Dam, India 228
—British Columbia, Water power of 569
—British Guiana, Water power available in. 803
—California requires more hydro-electric power 157, Power growth in California 184, Applications for power purposes 541

Page

WATER POWER—Continued
—Canada—Construction cost of plants.... 714
—Canada, Hydro-electric power in 668
—Canada, White coal available in 796
—Ceylon, Sources of water power in .. 281
—Chelan River, Hydraulic electric power plant at mouth of 241
—Cuba, Hydro-electric ice plant in. Kilian .....•248
—Czecho-Slovakia, Hydro-electric development 83
—Dam, Precautions to observe when operating gates at a. Wyss 222
—Federal water-power policy will mean, What a definite 1061
—Finland, Water power in 118, Amount exaggerated 548
—France, Hydro-electric power in 514
—Funds for investigating water-power resources 473
—Geographical distribution of coal and power activities 899
—Germany, Hydro-electric plants on the River Neckar 787
—"Great St. Lawrence The" 1060
—Hydraulic governor during short-circuits, Handling. Wyss 596
—Hydraulic turbine runner, A new type of. Nagler .....•81
—Hydraulic Turbines. Daugherty .....†612
—Hydro-electric central stations in Canada 1023
—Hydro-electric development will utilize 1,900-ft. fall of water 281
—Hydro-electric plant hints. Wyss 497
—Ice troubles, Preventing 310
—Improving an inefficient water power plant. Carpenter .....•768
—Induction generator for small water-power plants .....‡191
—Italy, Hydro-electric undertakings in ... 553
—Japan, Extension of hydro-electric projects in 1010
—Kern River No. 3 construction work, New. Dennis 556
—Leaks in hydraulic gates, Stopping. Wyss 100
—Leaks in rock-filled dams, The location and remedy of. McDonald 626
—Niagara power, Urges greater use of •314, Power canal constructed in 1842 481, Beauties and power developments of Niagara Falls 525, Work progressing 787
—Our power wastes 854
—Pacific Coast, Power problems of the. Bromley .....•701
—Pipe lines against collapse, Safeguarding. Carpenter 594
—Pop's water-power course. Carpenter. XV •99, XVI •260
—Power development and suggestions for future progress, A study of. Morrow .....•922
—Pressure regulator, R. K. hydro-electric.•888
—Riva Pelton turbine governor ..... •62
—St. Lawrence power. Vogelsang....357 397
—Secretary Lane's recommendations ...60, 71
—Spain's available water power 444
—Spanish hydro-electric plant, New 193
—Sweden's available water power 386
—Tacoma considering development of Lake Cushman power site 110
—Tacoma hydro-electric plant, Silt disposal at. Evans .....•694
—Trash racks for hydraulic power plants, Installation and maintenance of. McDonald .....•659
—Traveling screens reduced labor ....•1055
—U. S., Water-power development in the.1020
—Water power available for electric generator .....‡859
—Water-power bill—Cartoon •79, Progress in water-power legislation 185, 598, Senator Norris' amendment rejected 474, As reported from Conference Committee 825, Bill on the rocks 972, Bill becomes a law 1054, 1061
—Water powers already developed, Efficient utilization 1011
—Water powers, Our—Fallacies, facts and possibilities. Stafford 1040
—Water-turbine nozzle, Changed .....•189
—Waterwheel-driven alternators, Vertical-shaft—Mechanical features. Mortensen •698, Lubricating system and rotor •837 Brakes, ventilation and exciters .....•953

Page

WATER POWER—Continued
—When the coal is gone 106
—World's largest plant to be near Oregon-Washington border 812
—Year's progress in the power field....•2, 31
Water-pumping motor, Novel .....•814
Water purification, Boiler—Precaution against burns when handling lime.... 73
Water softening, Hot-process .....•429
Water-supply line, Air-bound .....‡683
Water—Transfer of heat requires difference of temperatures .....†521
Waterbury turbine explosion, Details of the .....•633
Waterwheel-driven alternators, Vertical-shaft—Mechanical features. Mortensen •698, Lubricating system and rotor •837, Brakes, ventilation and exciters.•953
Waterwheels used for braking and initial power 612
Watts & Walsh Co.—Compressed-spruce pulley .....•885
Wayne, New, gravity oil filter .....•970
Weld-testing device .....•346
Welded joints, Electric-arc .....•925
Welded stay-bolt holes, Electrically .....•151
Welding machine, Automatic arc .....•548
Welding machine, Automatic—Year's progress in the power field .....•2, 31
Welding, Rules for autogenous 471
Welding Steam Boiler and Flywheel Service Bureau accept autogenous 40, Repairs made by electric welding .....•462
Welds, Electric arc vs. gas 604, 934
"Welfare" activities of engineering societies, Future organization for 279
West Penn Power Co.—Vertical shaft being driven to a 7-ft. vein of coal..... 184
Western Society of Engineers—Foresees great developments, 239, Engineers' influence in public utilities 611, Governing boards of Founder Societies meet in Chicago 745
Westinghouse Electric and Mfg. Co.—Safety motor-starting switch •65, Governors of small turbines •135, Change in the design of rotary converters and generators 137
Wheeler auxiliary tube-plate condenser, New .....•227
Wick-feed oiler, Using compression grease cup as .....•33
Willans total steam line. Flory .....•740
Winding connections, Three-phase four-pole induction motor. Dudley .....•455
Winding of an induction motor, Different steps in the. Dudley .....•325
Windings, Connection diagrams of induction-motor. Dudley .....•56
Wire scraper made from hacksaw blade..•679
Wiring connections of transformers and meters .....•390
Wiring diagram for synchronous motor with separate exciter. Mortensen.•91, •603
Wiring diagram for temperature indicator. Mortensen .....•470
Wiring diagram of exciter circuits .....•855
Wiring diagram of off-peak cutout .....•392
Wiring diagrams for an exciter and an oil-switch battery. Welcke .....•717
"Woman and machine" problem, That.. 232
Wood, E. F., Death of 281
Wood, Fuel value of 787
Wood ships Emergency Fleet Corp. water-tube boilers for. Dean, Kreisinger ... •348, Ed. 516
Wool for steam-pipe covering, Tests on slag 280
Worm, The, commences to turn 558
Wrench, Adjustable ratchet .....•776
Wrench, Left-hand adjusting screw of monkey .....‡275
Wright, Orville, presented with John Fritz Medal 823

Y

Yacht "Elfay," Diesel-electric equipment of the .....•452
Year Book for 1920, Mechanical World..†570
Year's progress in the power field •2, 31, Correction 157
Youngster a chance, Give the 268
Youngstown, Ohio—Power drives for rolling mills, Rogers .....•17, •95, •171, •291, •465, •542, •622, •800, •962

AUTHOR INDEX

AIREY. Overhauling and aligning the engine, *764.

Aitchison. Valve failure and valve steels in internal-combustion engines, 396.

Alden. Losses due to removing hot air from factories, *93.

Allison. Standard meter rates—Basis of development, 183, 186. How applied in calculating power bills, *218. Demand rates, *257.

Anderson. Pulverized coal under central-station boilers, *336, 339, Ed. 341, *354, 681, Comparative cost, 783, 855, Comparison of tests, 1013.

BATCHELLER. Diagram for computing thickness of plate for steel pipe, *656.

Beard. Equipment vs. men, *85.

Berkshire. Synchronous-motor applications, *166, Unity power-factor synchronous motor, *850, 854.

Berry. Chart for finding power factor, *795, 816.

Black. Simple belt-lacing rules, 761.

Blakely. The Hvid engine and its relation to the fuel problem, *38.

Braymer. Armature Winding and Motor Repair, †612.

Brayton. Calculations from a flue-gas analysis of loss due to incomplete combustion, *139, Loss due to excess air, 264, 681, Charts for graphical determination of pipe sizes and velocity of flow of steam *662, *762, Some notes on the loss of head due to friction in water pipes, 848.

Briggs. Emergency automatic controller, *143, An electric-arc soldering iron, *545, Unsoldering leads from commutator, *656, Operating two similar alternators having opposite polarity in parallel, *810, 816, Paralleling two alternators when they rotate in opposite directions, *886.

Bromley. Mechanical stokers aboard ship, *86, Extension to L Street Station, Boston, *124, Steam-turbine governors—Governors of 75- to 3,000-kw. Curtis turbines, *414, Power problems of the Pacific Coast, *701.

Brown, M. L. Qualities of success, 674.

Brown, W. The cost of low power factor, *24.

Burgess. Care and maintenance of plunger hydraulic elevators, *101.

CARPENTER. Pop's waterpower course XV, *99, XVI, *260, Safeguarding pipe lines against collapse, 594, Do your own thinking! 615, Improving an inefficient water-power plant, *768.

Cheney. Smiles, *1, Over the top with the boiler room crew, *247.

Clock. Peculiar flywheel accident, 514, Rules for the safe operation of steam engines and turbines, 732.

DANIELS. Fuel-oil vs. mechanical stokers, *684, Criticism 932.

Darter. How to locate faults in d.-c. armatures, *660.

Daugherty. Hydraulic Turbines, †612.

Davis, Jordan. Measuring flow of water by orifice, *238.

Dean, Kreisinger. Emergency Fleet Corp. watertube boilers for wood ships, *348, Ed. 516.

Dennis. Steam electric power-plant layouts, 104, New Kern River No. 3 construction work, 556.

Dick. Pulverized Fuel, Its Uses and Possibilities, †84.

Dixon. Copying a bad example, *949.

Drake. Induction and synchronous motors for industrial applications, 822.

Dudley. Reconnecting induction motors—Reconnecting problems, *55, Locating faults in induction motors—Noise and vibration, *299, Most common defects, *325, How to make tests, *453.

Duffey. Financing improvements for the power plant, 774.

EASTON. Electric motors for pulp and paper machinery drives, *584, Motors for driving ventilating fans, *759, 777.

Ehlinger, McManus. Chart for determining proportions of gear teeth, *541.

Evans, G. A. Relative value of coal and oil fuel, *637.

Evans, L. Silt disposal at Tacoma hydro-electric plant, *694.

FERNALD, Schmeltzer. Standard lubricating oil systems for geared turbines, 194.

Findley. Testing polyphase watt-hour meters, *875.

Fleming. Oil as a fuel for boilers and furnaces, *550.

Flory. Steam-turbine economy characteristics, *740.

Franklin. Electrical drives for lumber mills, *536.

GAUSS. Developing the chain-grate stoker, *144, 517, How to improve boiler efficiency, *180.

Gavett. Two indirect methods of finding the weight of ammonia in circulation in compression refrigeration, *1042.

Gibbs. Single-phase load on a 3-phase power system, *552, 3-phase power from single phase transformer connections, *672, How 3-phase transformers operate, *1002.

Gillooly. Ground detectors for d.-c. and a.-c. circuits, *508.

Gitto. What constitutes proper elevator inspection? 607, Ed. 598.

Graham. How power factor affects the voltage regulation of an alternator, *379.

Grant. How two a.-c. motors were controlled in parallel, *1006.

HAMILTON. Graphic meter records and their interpretation, *803.

Hamkens. Steam-engine operation and maintenance—Loose crankpins and loose cranks, *805.

Harris. Templet for cutting commutator mica segments, *635

Heermans. Parallel discharge of centrifugal pumps, *554.

Hemingway, Page. Riveting patches on cylindrical pressure shells, *164.

Herter. Losses in belt transmission, 251.

Hill. Practical refrigeration for the operating engineer—Getting acquainted with the plant, *320, (Correction 604), 784, Refrigeration for the practical engineer, 382, 388, Regulation of pressures and temperatures, *581, Precautions when pumping ammonia from coils, *718, Testing for ammonia leaks in refrigerating plants, *955.

Hopley. Buckle down, 285.

JAMES. Controllers for Electric Motors, †525.

Jarvis Composition and use of babbitt metals, *616.

Jeffrey. Electrically driven hoists, *286, Adjustable-speed motor equipment for rolling mills, *408, Electrically driven steel reversing mills, *1030, 1054

Johnson. Equivalent evaporation, *28.

Jones. Automatic control for motors driving pumps and compressors, *498.

Jordan, Davis. Measuring flow of water by orifice, *238.

KILIAN. Model small ice plant in Cuba, *248.

Kreisinger, Dean. Emergency Fleet Corp. watertube boilers for wood ships, *348, Ed. 516.

Kurtz. Soldering a handhole seat, *139.

LANGTRY. Purchase of coal on the B.t.u. basis, 606.

Lee. Standardization of boiler plants, *374.

Lord. A perfected high-pressure rotary compressor, *156.

McBRIDE. Fuel efficiency in power production in different states, 386, B.t.u.'s vs. kw.-hrs. per ton of coal as measure of efficiency, Misostow, 735, McBride, 931, Testing engines for 40,000 ft. in the air, *792.

McDonald. The location and remedy of leaks in rock-filled dams, 626, Installation and maintenance of trash racks for hydraulic power plants, *659.

McManus and Ehlinger. Chart for determining proportions of gear teeth, *541.

Macintire. Refrigeration study course—I, What is mechanical refrigeration? *63, Ed. 32, II, Ammonia-compression system, *138, The ammonia compressor, *220, The ammonia condenser, *301, Ammonia fittings and accessories, *359, The brine system, *540, Insulation, *630 Low-temperature ammonia compression, *669, The high-speed ammonia compressor, *769, Automatic refrigeration, *840, Refrigerants, *914, Cooling water, *1004.

Marsh. Burning Illinois coal from vein No. 5, *1001.

Misostow. Correct height of r.-t. boiler above the grate, *1034.

Moran. On the road with the refrigerating troubleman, 420, 509, 807, *873.

Morgan. Design and construction of power-plant piping, 384, *797, Efficient operation of the boiler plant, *868, *957.

Morrison. Measuring Diesel-engine crankpin clearance, *20.

Morrow. A study of power development and suggestions for future progress, *922.

Mortensen. Synchronous motors for driving centrifugal pumps, *90, *603, Turbine-driven vs. engine-driven alternators—I, *330, II, *425, III, *469, Vertical shaft waterwheel-driven alternators—Mechanical features, *698, Lubricating system and rotor, *837, Brakes, ventilation and exciters, *953.

Moss, Motivation, 831.

Myers, C. Some characteristics of shaft governors, *845.

Myers, D. M. Oil fuel vs. coal, 352.

Myers, M. A. Electric elevator machinery—Motor operation, *920, Brake adjustments, *1038.

NAGLER. A new type of hydraulic turbine runner, *81.

Nichols. Coal consumption in institutional heating plants, *654.

Ninde. Design and Construction of Heat Engines, †525.

Noble. Home-made emergency valve, *214.

OSBORNE. Practical lubrication—Oils and their physical characteristics, *66, Steam-cylinder lubrication, 140, The lubrication of steam-engine bearings, *215, Steam-turbine lubrication, *322, Lubrication of electric motors, 378, Air-compressor lubrication, 495, Lubrication of internal-combustion engines, 590.

PAGE, Hemingway. Riveting patches on cylindrical pressure shells, *164.

Pagett. A drop of water, *693.

Parham. Testing on a grounded circuit, *593, Investigating failure of d.-c. motors to start, *628.

Parish. Balancing fuel, lubricant and motor, *565.

Parker. The Bourdon gage spring, *722.

Parr, Powell. A study of the Forms in Which Sulphur Occurs in Coal, †84.

Parsons, R. H. Coal Consumption of Power Plants and Bonuses for Coal Saving, †281.

Parsons, W. E. Absorption machine merely needed better steam circulation, 69.

Patterson. Lining turbine and generator shafts, *370.

Pearson. Selling Your Services, †570.

Peel. Examples in Heat and Heat Engines, †689.

Peterson. Ford uses large refrigeration plant in making automobiles, *366.

Phelps. Sampling tanks vs. continuous recorders for determining CO_2, *297, Flue-gas temperature and CO_2 as a guide to furnace operation *725

Polakov, W. N. Boiler-room instrument boards, *228.

Porter. Where the ammonia charge goes, 618, 896, Coal or oil fuel for refrigerating plants? 889.

Potter. Elements of Steam and Gas Power Engineering, †788.

Powell, Parr. A study of the Forms in Which Sulphur Occurs in Coal, †84.

Putnam, Seely. Relation Between the Elastic Strengths of Steel in Tension, Compression and Shear, †788.

RANKINE. Reducing noise and vibrations, 580.
Ray. Safety first for the engine room, 686.
Reed. Drying out a generator, switchboard and motors after a flood, *250. Repairing a shell-type transformer, *723.
Rice. Monel-metal blades in destroyer turbines, *908.
Roberts. Crude petroleums and lubricating oils, 842.
Robison's Manual of Radio Telegraphy and Telephony, †84.
Rogers. Power drives for rolling mills, *17, *95, *171, *291, *465, *542, *622, *800, *962.
Royer. Gas-steam unit shows 72.4 per cent thermal efficiency at Ford Works, *532, 649
Ruegg. Surcharging Diesel engines, *712.
Ryan. Refrigerating effect of natural and artificial ice, 731.

SALLER. Treatment of power-plant trouble, *58. Removing heads from small condensers, *89. Handy soldering iron, *836.
Schmeltzer, Fernald. Standard lubricating oil systems for geared turbines, 194.
Seaton. Kerosene as a fuel for high-speed engines, *154.
Seely, Putnam. Relation Between the Elastic Strengths of Steel in Tension, Compression and Shear, †788
Smith, E. A. Excerpts from elevator safety orders State of California, 236.
Smith, G. H. Three power-plant leaks that waste coal, 627, 976.
Smith, G. O. and F. G. Tryon. Fluctuations in coal production—Their extent and causes, *422, 431. Engineering as prosperity insurance, 480.
Smoot. High-speed turbine-driven blowers, *450.
Sniffen. The steam turbine, 82.
Snow. Adjustment of valve-timing mechanism, *968.
Solomon. Cleaning the double-pipe ammonia condenser, *169.
Spitzglass. Measuring flow of fluids, *503.
Stafford. Our water powers—Fallacies, facts and possibilities, 1040.
Stevens. Proposed super-power central station (supplement), *832, 853, Economies to be expected, *879.
Stoek. How bituminous coal can be stored safely, 522, Ed. 515.
Street. Recent court decisions, 20, 36.
Strohm The chronic grouch, *47, Gonna! 207, Alibi Al, *407, Two-faced Tom, *491, Indispensability, *653, Bonehead Bill, *791, Presto! Change-O! *867, The big stick, 1029.
Sykes. Propelling machinery for U. S. S. "Tennessee," *413.

TAYLOR, D. M. Steam-jet air pumps for condensers, *995.
Taylor, T. S. The flow of air through small brass tubes, *1022.
Thomas, C. C. Future of marine propelling machinery, *461.
Thomas, P. H. Chile Exploration Co.'s Tocopilla power plant, *492, 515.
Thompson. Pulverized fuel at Oneida St. Plant, 339, *336, Ed. 341, *354, 681, Comparative cost, 783, 855, Comparison of tests, 1013.
Todd. Overload relays—Principles of operation, *131, Explanation and measurement of power-factor, *224, Explanation and measurement of reactive factor, *620, 639, Protective and service restoring relays, *912.
Tryon, Smith. Fluctuations in coal production—Their extent and causes, *422, 431.
Tullis. Some refrigerating plant experiences, 30.
Turner. Dead-ending conductors to floor timbers, *928.

VOGELSANG. St. Lawrence power, 397.

WALDEN. Combined gas and motor-driven pressure booster station, *950.
Walton. Prolonging the life of condenser tubes, *588, 976.
Weaver. Moderation, 449.
Weber. Interconnecting industrial and central station plants, *1049, 1053.
Welcke. Storage batteries for emergency service, *715.
Wheeler. Air pumps for condensing equipment 195, Dalton's law applied to air-pump capacities, *296.
Wilkie. Economy at the Finney Avenue Ice Plant, St. Louis, *990.
Wilkinson. Color schemes for plant piping, 610.
Williams. Cleaning apparatus for generator windings, *878.
Williston. An advocate of the junior technical school, *428.
Wilson. Moline Station adds to steam and generating capacity, *208.
Woods. New power plants for saw mills, *162.
Woodwell. In charge of the engineers, 686.
Wyss. Stopping leaks in hydraulic gates, 100, Precautions to observe when operating gates at a dam, 222, Hydro-electric plant hints 497, Handling hydraulic governor during short circuits, 596.

YEATON. Wattmeter and power-factor indicator connections, *846.